AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

Reg. U. S. Pat. Off

Published Weekly
Volume 72
Number 19

JULIAN CHASE, Directing Editor
DON BLANCHARD, Editor
P. M. HELDT, Engineering Editor — JEROME H. FARRIS, Ass't Editor
JOS. GESCHELIN, Detroit Technical Editor — T. LAWTON SLAUGH, News Editor
HAROLD E. GRONSETH, Detroit News Editor — GEOFFREY GRIER, Art Editor

Contents

News of the Industry 621
Business in Brief 630
Calendar of Coming Events 631
How Pontiac Produces Crowned and Skirted Fenders. By Joseph Geschelin 632
Rear and Under-Chassis Mounted Engines Increasingly Popular in Motor Bus Field. By P. M. Heldt 634
Stout Laboratories Follow "Scarab" Design in Bus Construction 638
Just Among Ourselves 639
New Truck and Passenger Car Registrations 640
Automotive Abstracts 642
Production Lines 644
Bendix Develops Rotary Vacuum Pump for Use With Power Brakes 645
American Cars Lead in Acceleration and Speed; British in Fuel Economy 647
1935 Cars List at Slightly More Per Pound 649
New Developments 650
Advertisers' Index 44

C. A. MUSSELMAN, Pres. and Gen. Mgr.; J. S. HILDRETH, Vice-Pres. and Director of Sales; W. I. RALPH, Vice-Pres.; G. C. BUZBY, Vice-Pres.

OFFICES

Philadelphia—Chestnut & 56th Sts., Phone Sherwood 1424
New York—239 W. 39th St., Phone Pennsylvania 6-1100. Chicago—Room 1116 London Guarantee & Accident Bldg., Phone Franklin 9494. Detroit—814 Stephenson Bldg., Phone Madison 2090. Cleveland—609 Guardian Bldg., Phone Main 6860. Boston—301 United Shoe Bldg., Phone Liberty 4460. San Francisco—444 Market St., Room 305, Phone Garfield 6788. Long Beach, Cal.—1595 Pacific Ave., Phone Long Beach 613-238.

Cable Address ..... Autoland, Philadelphia

SUBSCRIPTION RATES: United States, United States Possessions, and all countries in the Postal Union, $1.00 per year; Canada and Foreign, $4.00 per year. Single Copies, 25c.

Member of the Audit Bureau of Circulations
Member Associated Business Papers, Inc.

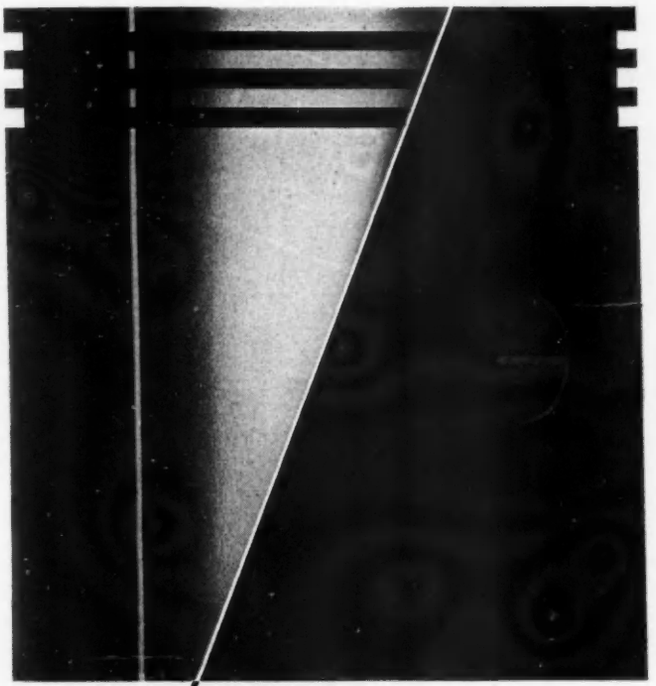
Entered as second-class matter Oct. 1, 1925, at the post office at Philadelphia, Pa., under the act of March 3, 1879.
Automotive Industries—The Automobile is a consolidation of the Automobile (monthly) and the Motor Review (weekly), May, 1902; Dealer and Repairman (monthly), October, 1903, the Automobile Magazine (monthly), July, 1907, and the Horseless Age (weekly), founded in 1895, May, 1918.

Owned, Published and Copyrighted by

CHILTON COMPANY
(Incorporated)

Executive Offices
Chestnut and 56th Streets, Philadelphia, Pa., U. S. A.

C. A. MUSSELMAN, *President*
FRITZ J. FRANK, *Executive Vice-President*
FREDERIC C. STEVENS, JOSEPH S. HILDRETH, GEORGE H. GRIFFITHS, EVERIT B. TERHUNE, ERNEST C. HASTINGS, *Vice-Presidents*
WILLIAM A. BARBER, *Treasurer*. JOHN BLAIR MOFFETT, *Secretary*



THE "SAFETY FILM" PROTECTS.....

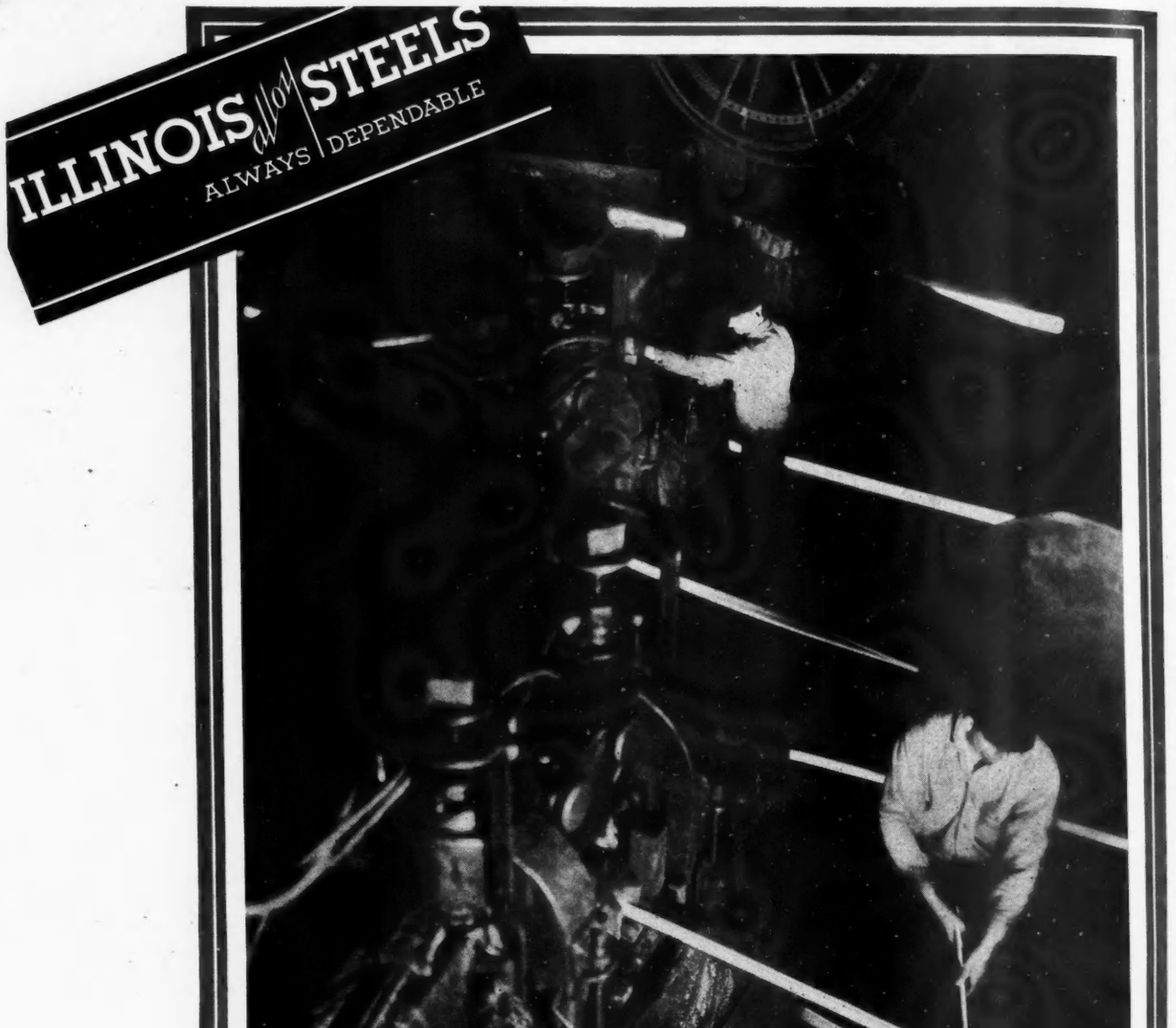
Engineering art has developed, in answer to modern demand, high compression, high speed engines that are designed "to go places" -- Science, has furnished "dag"★ Brand colloidal graphite which safeguards and eases the way. ❖ This product is an ideal adjunct lubricant for crankcase and top cylinder lubrication and is of particular value during both the assembly and break-in periods. With proper use, it forms on the friction parts of mechanical devices a mirror-like, self-lubricating film of graphite. ❖ This graphoid surface protects against metal-to-metal contact and aids in oil spread. ❖ Write for Technical Bulletin No. W40 discussing analyses of typical crankcase oils.

★Reg. U. S. Pat. Off.

REG U.S. dag PAT. OFF. COLLOIDAL PRODUCTS

Acheson

COLLOIDS CORPORATION
FOUNDED 1908 AS ACHESON OILDAG COMPANY
PORT HURON MICHIGAN



TIME . . . AND *HEAT*, WAIT FOR NO MAN

● The man who first coined the expression "like greased lightning" must have been watching an alloy bar mill in operation.

Speed . . . controlled speed . . . sometimes fast, sometimes slow . . . is of vital importance in securing the proper physical qualities in alloy steel. For speed is a means of controlling the temperature of the steel during the forming operations. Illinois Steel Company has provided every modern means for controlling speed and temperature in its alloy production. This is one reason, and a big one, why users have learned that Illinois Alloy Steel maintains quality consistently and uniformly whether you buy a bar at a time or in thousand-ton lots.

ILLINOIS STEEL COMPANY
208 SOUTH LA SALLE STREET, CHICAGO, ILLINOIS

United States Steel Corporation Subsidiary

AUTOMOTIVE INDUSTRIES

Vol. 72, No. 19 ▫ THIRTY-SEVENTH YEAR ▫ May 11, 1935

April Record Month Since '29

Retail Sales Fluctuating; Lower May Output Expected

by Harold E. Gronseth
Detroit News Editor, Automotive Industries

Motor vehicle retail sales have been holding at or near the top level for the year but weekly reports of various companies are beginning to show fluctuations instead of a steady upward climb and the penetrations of previous high marks are becoming fewer. These and other developments have cast some doubt on the ability of May to maintain the swift pace of April when the domestic market is estimated to have absorbed around 335,000 new passenger cars and 52,000 trucks or a total of 387,000 vehicles.

Some soft spots have made their appearance in the retail market but these might be attributed to unfavorable weather conditions, and the ever optimistic sales executives are still counting on the maintenance of a good spring volume. Sales drives are reported to be bringing good results. Officials are watching closely the sales reports for the next week or two which will determine whether or not the up-trend for this season has been reversed.

At this point manufacturers also are feeling their way cautiously on production programs. The curtailment in plants affected by strike troubles together with an easing off in operations of some of the other producers makes it virtually certain now that May production for the industry will not attain the high April volume, estimated by the AMA at 477,546 units which, barring only the peak year 1929, was the biggest April output in history.

With few exceptions the companies have adequate stocks in the field. In a few instances they may be a little high but statisticians estimate that the industry as a whole has not over a month's supply on hand, or

(*Turn to page* 628, *please*)

Hupp Replaces Model 521J With 8-Cylinder Series

A new eight-cylinder series priced at $1,195 for the standard and $1,245 for the deluxe bodies has been added to the Hupp line, superseding the six-cylinder model 521J which listed at $1,095 and $1,170 for the standard and deluxe models respectively.

Specifications of the new job indicate that it does not differ materially from the six which preceded it except for the engine. The power plant has the same bore and stroke, 3 3/16 x 4¾ in., as the Model 527. The piston displacement is 303.2 cu. in. and the horsepower 120 at 3500 r.p.m. The rear axle ratio is 4.273 to 1, against 4.45 in the former six. The wheelbase is 121 in. Bodies in the new series consist of four-door, six-passenger sedan, four-door, five-passenger victoria and two-door, three-passenger coupe.

Dual Performance Rear Axle Announced by GMT

General Motors Truck Co. announces that a dual performance rear axle is now available for GMC one and one-half to two ton trucks. The new feature was introduced several months ago on the GMC T-18 trucks in the two to three ton range.

To Resume Negotiations

DETROIT, May 9—William S. Knudsen, executive vice-president of the General Motors Corp., announced this evening that a conference had been agreed upon for Saturday morning at 9 a. m. in Toledo between representatives of General Motors, Chevrolet and a committee of workers representing Federal Labor Union No. 18384. Also included in the group to confer are F. J. Dillon, A. F. of L. general organizer, Edward F. McGrady, Assistant Secretary of Labor, and Thomas J. Williams, Federal Conciliator from Washington.

Removal of Wolman, Byrd From ALB Asked by Workers

Removal of Richard L. Byrd and Dr. Leo Wolman from the Automobile Labor Board was asked in a resolution passed by the Officers Association of Automobile Industrial Employees. The motion was offered by representatives of Plymouth plant employees and cited as reasons for the request "incompetency of Byrd and lack of cooperation with labor on the part of Dr. Wolman."

Arthur E. Greer, president of the Hudson local of the Associated Automobile Workers of America, was elected secretary-treasurer to replace George Gilbert, resigned.

With production at 450 cars weekly, Willys-Overland will complete the 15,000 cars authorized by the court about June 19. Receiver David R. Wilson will seek authority to build 7500 to 10,000 more cars.

Chevrolet Workers Vote 1,251 to 650 For Rejection of Company's Proposals

DETROIT, May 9—Employees of the Chevrolet plant in Toledo, closed two weeks ago as a result of the strike called by the A. F. of L. union, yesterday voted 1,251 to reject and 605 to accept the counter proposals made by the company to the union demands, indicating that further negotiations will be required to effect a settlement.

There were 2,228 eligible to vote under the rules laid down by Edward F. McGrady, Assistant Secretary of Labor, in charge of the poll. Although at least 10 leaders in the independent workers society were stoned away from the polling place by a mob of 300, the A. F. of L. union won a clear majority.

Mr. McGrady held conferences here with W. S. Knudsen of General Motors and with F. J. Dillon of the A. F. of L. today. Union leaders are taking the position that the next move is up to GM. Mr. Dillon said that the poll confirmed the A. F. of L. contention that the corporation's labor policy was unsatisfactory to the majority of its employees and that it makes it obligatory on GM to adjust itself to a changed order by proceeding at once to negotiate with the accredited representatives of the A. F. of L. to effect a settlement.

The decision to hold the poll followed

(*Turn to page* 628, *please*)

Wagner Bill Not Improved by Changes in Committee; Measure Goes to Senate

The Wagner Labor Relations Bill, with modifications which do not in any way make it more acceptable to industry, was reported favorably to the Senate last week by the Committee on Education and Labor.

The revisions include a rephrasing of the declaration of policy, the addition of a fifth unfair labor practice classifying as such a refusal by an employer to bargain collectively with the representatives of his employees, the elimination of the provision permitting industrial labor boards to have original jurisdiction of a dispute at the discretion of the National Labor Board, the elimination of the right of employers to subpoena witnesses and the deletion of the entire section authorizing the board to function as an arbitrator.

The committee defends its failure to make coercion from any source an unfair labor practice on the grounds that the organization activities of labor are outside of the scope of the bill and also that the courts might interpret such a prohibition in a way that would interfere with legitimate activities. The committee indicated further that it felt that adequate remedies for coercion by labor organizations were provided in existing state and federal laws.

The committee also defends the exception granted closed shop agreements entered into with the representatives of the majority from the provision of the bill which makes it an unfair labor practice to discriminate against anyone because of his union connections. It declares that statements that this proviso attaches special legal sanctions to the closed shop, or seeks to impose it upon all industry, are absolutely false.

The committee explains that the new provision, making it an unfair labor practice for an employer to refuse to bargain collectively with the representatives of his employees, does not compel the making of agreements or permit governmental supervision of their terms.

A new feature of the declaration of policy apparently makes the ironing out of variations in wage rates and working conditions within and between industries a part of the intention of the bill.

The committee's discussion of the majority rule principle says that it "does not imply that any employee can be required to join a union, except through the traditional method of a closed shop agreement, made with the assent of the employer. And since in the absence of such an agreement the bill specifically prevents discrimination against anyone either for belonging or for not belonging to a union, the representatives selected by the majority will be quite powerless to make agreements more favorable to the majority than to the minority." Critics of this argument, however, point out that in actual practice the majority probably in most cases will be likely to seek a closed shop agreement as one of its first actions after its right to represent all the workers has been established. If the majority is powerful enough to enforce this demand, the only alternatives minorities have are to join the majority organization or to lose their jobs.

The committee maintains further that instead of favoring the closed shop the bill actually narrows existing law on such agreements. In support of this contention it points to the fact that a closed shop agreement is only legal with the majority organization, whereas at present it can be negotiated with a minority union.

Automotive Support For NRA Extension

APEM, Dealer Executives Urge Continuation Up To 2 Yrs.; Chalfant Approves

Continuance of NRA and its attendant codes for periods ranging from 10 months to two years was urged upon Congress last week from three automotive sources. The APEM and a group of dealer association executives in connection with the NADA passed resolutions calling for NRA's extention for 10 months and two years respectively. E. P. Chalfant, executive vice-president of NSPA and president of the National Association of Trade Association Executives, said at a session of the U.S.C.C. convention, that automotive jobbers "would regard the scrapping of their code as little less than a catastrophe." He urged continuation for at least another year.

The APEM resolution, adopted at a recent director's meeting, in part said: "It is the opinion of this industry that prompt action by the Congress to extend the present N.I.R.A. for a period of 10 months would have a stronger stabilizing influence and would be more beneficial to general recovery than the consideration at this session of Congress of any new legislation on this or related subjects, now therefore, be it resolved by this Board, that the Congress be requested to extend the present N.I.R.A. for a period of 10 months." A copy of this resolution was sent to each member of the Senate.

The other resolution, signed by F. W. A. Vesper, NADA president, and sent to President Roosevelt and Senator Harrison, was adopted at a meeting of secretaries and managers of state and local dealers' associations. Briefed, it stated: "We . . . insist on the extension for two years, as against eight or nine months, of the National Recovery Act. Two years . . . are imperative for the stabilization of our trade. . . . A short extension will only increase the uncertainity now prevailing and further hamper enforcement. We urge extension for two years with full support of the automobile dealers of America."

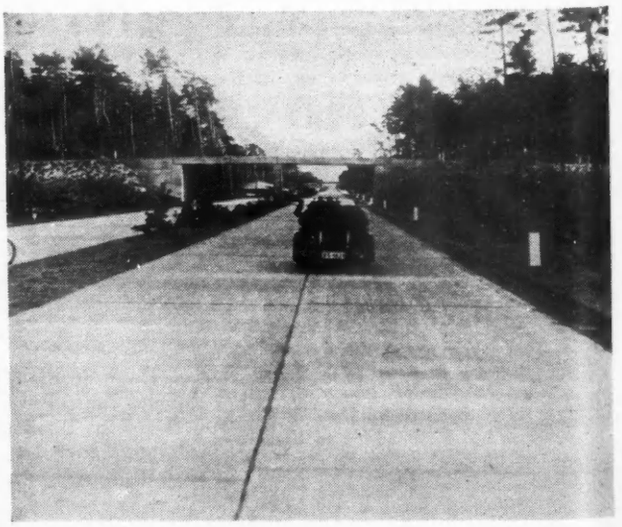
Mr. Chalfant, during his address, said: "Were an analysis of the reports rendered by the auditors of those firms (automotive jobbers) that have been complying with the regulations laid down by their code, it would doubtless be found that code compliance has meant an actual gain to them in dollars and cents. . . . Until they were brought together under the code, the jobbers were not in common agreement as to distribution ethics. For the first time they now have a common meeting ground and it is inconceivable that they would willingly surrender the advantage this gives them."

New Tools and Machinery Costing Nash $1,525,000

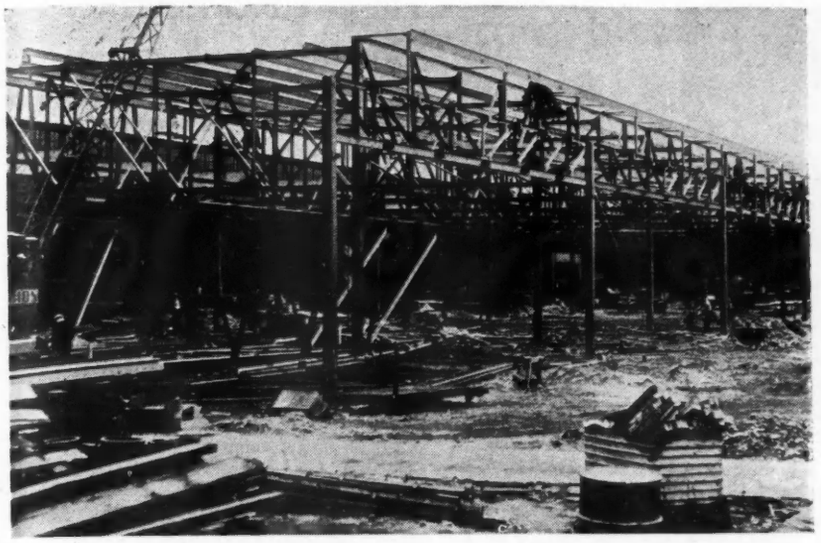
Manufacturers of heavy machinery, dies and small tools have received orders totaling $1,525,000 from Nash Motors during the past six months, according to E. H. McCarty, president of the company.

Most of this new equipment will be used in the production of the additional Nash series which has been under process of development for some time.

Installation of a battery of new type welding machines of large size has been completed in the Milwaukee plant of the Seaman Body Corporation, Nash body division; additional presses for fender and other sheet metal work are now in operation in the company's Kenosha factory, while a general efficiency program, designed to speed up production, has been put into effect at both Kenosha and Racine.



The first of the German super-highways being built by the Hitler government to be opened—a section of the road connecting Frankfort/Main and Darmstadt



The steel skeleton of the addition being built to the Dodge truck plant in Detroit. The 576 x 96 ft. structure will be completed within a few weeks and will provide 55,296 square feet of floor space.

D. M. Averill Named Works Manager of Nash Plants

D. M. Averill, for the past 10 years manager of the Racine division of Nash Motors, has been named works manager in charge of both the Kenosha and Racine plants of the company, according to E. H. McCarty, president of Nash.

Mr. Averill joined the Durant-Dort Carriage Co. in 1898 working directly under C. W. Nash. In 1914, when the firm became the Dort Motor Car Company, Mr. Averill was made general manager.

When Nash expanded operations in 1924 and purchased the former Mitchell Motors property in Racine, Mr. Nash named Mr. Averill manager of the new plant.

DeSoto Wins Premier Prix In Aerodynamic Class

For the second year in succession, an American made streamline car has been awarded the coveted premier prix in the aerodynamic class at the famed annual Concours D'Elegance, held at Monte Carlo in Monaco, it was announced this week. The automobile, an Airflow DeSoto coupe, was the only American car to figure in the aerodynamic class in which it was entered, cable information received by Byron C. Foy, president of DeSoto, stated.

USCC Votes for States' Rights on Sizes, Weights

In addition to registering its opposition to the administration's legislative program practically in its entirety, with the exception of the regulation of all interstate carriers, the U. S. Chamber of Commerce, at its meeting last week, voted that the "determination of the standards for highway construction and the size and weight of vehicles operating over them should be left to the several states in accordance with their respective situations and problems."

This endorsement of states' rights would have been more acceptable to motor interests if it had been accompanied by a statement encouraging and approving efforts to get the states to act with greater uniformity in these matters, to end present chaotic conditions.

On the regulation of motor carriers, the Chamber voted for separate bills regulating buses and trucks, regulation of rates and services of all forms of transportation by the Interstate Commerce Commission with the temporary exception of aviation, and the reorganization of the Commission into divisions to handle the different carriers.

The Chamber also endorsed highway planning which has aroused some speculation as to how it is to be done on a rational basis unless there is greater agreement among the states as to what limitations should be placed on sizes and weights.

Name Gorrell Chairman of Collier Trophy Committee

The close relationship between the two great branches of the automotive industry, aviation and automobiles, has recently been evidenced by the appointment of Col. Edgar S. Gorrell, president of the Stutz Motor Car Company of America, Inc., as chairman of the Collier Aviation Trophy Committee for 1935. In addition to the appointment of Mr. Gorrell as chairman, Senator William G. McAdoo, president of the National Aeronautic Association, has announced the following members of the committee: Maj. James H. Doolittle, Charles L. Lawrance, William B. Stout, president of S. A. E., and Edward P. Warner.

NRA Future Uncertain as Senate and House Disagree on Extension Period

WASHINGTON, May 9—With the Supreme Court of the United States taking the Schechter Poultry test case under consideration, the Senate Finance Committee reporting out a bill to continue it until April 1, 1936, with price-fixing and code control of intrastate business barred, and leaders in the House insisting upon the administration's two-year extension measure, the future of NRA hangs in the balance.

The two arguments before the Supreme Court last week in the Schechter case centered around the vital points of delegation of legislative powers by Congress to the President and whether wages and hours can be controlled by the Federal government under the commerce clause of the United States. Decision adverse to the government would, in all probability, mean scrapping of NRA.

House leaders have turned on the Finance Committee resolution and to the support of the administration bill. Speaker Byrns said he doubted that the House would accept an eight or nine month extension of NRA and said he thought the Ways and Means Committee probably would prefer two years. If NRA is no good, he stated, it ought to be repealed, but if it is good it ought to be extended long enough to remove doubt.

Should the Finance Committee resolution be passed by the Senate and should the House hold fast and pass the administration bill, the tussle over NRA would have to go to conference and either the Senate or House be compelled to yield, unless a compromise of some kind were agreed upon.

In the arguments in the Schechter case, attorneys Frederick H. Wood and Joseph Heller, both of New York, emphasized the contention that wages and hours provisions under the poultry code come strictly with intrastate regulation. On the other hand Solicitor General Stanley Reed and Donald Richberg, chairman of NRA, appointed by the Department of Justice as an assistant attorney to argue the case, held that the wages and hours do affect interstate commerce as does the killing and sale of poultry and that, therefore, Congress had not delegated undue authority by which NRA assumed jurisdiction over these matters. The lower court, while sustaining conviction of the Poultry corporation on 17 of 19 counts of code violation, dismissed two counts, charging violation of wage and hour provisions. The lower court said these provisions are beyond the power of Congress. The case was appealed as a test of NRA.

It now is a question as to when the Supreme Court will hand down its decision. In the event it does so before Congress adjourns or prior to June 16, when the present Recovery Act expires, it would be a guide to legislation for extension of NRA. But if it is extended before the decision is handed down, it might be necessary to greatly revise the act again. It is also recognized that an adverse decision may so greatly affect the Recovery Act as to make it lose its force and therefore leave the administration no alternative except to scrap it.

Metal finishers in the Fisher Body plant hanging doors, installing rear deck covers and smoothing rough edges on Pontiac bodies before the Duco and color finish is applied

GM Muncie Products Plant in Operation

Producing Transmissions for Chevrolet, Pontiac; Employing 300 Workers

General Motors Corp. started operations Tuesday in its Muncie Products Plant (Muncie, Ind.), hurriedly equipped at an estimated cost of $600,000 for the manufacture of transmissions after the Toledo strike cut off the supply of these parts for the Chevrolet and Pontiac divisions.

The plant opened with a force of 300 workers and will turn out 50 transmissions an hour working two shifts a day. For the present no expansion of the plant is contemplated but, should business warrant, about 1200 could be employed in the existing structure. With the exception of 10 executives all these employed are former Muncie Products employees, preference being given to Muncie residents. The prevailing Muncie wage scale is to be paid.

S. W. Skusa, formerly with Olds division at Lansing and a member of the General Motors organization for 22 years, has been made works manager. W. J. Lampert is named comptroller, and Ray D. Stuart purchasing agent. Mr. Lampert has been with the corporation 10 years, and Mr. Stuart 13 years.

The Muncie Products division was closed and equipment removed in 1932. With its reopening General Motors will have two units functioning in Muncie, the other being the Delco-Remy battery plant on West Willard Street.

Bad Weather Delays Track Testing at Indianapolis

INDIANAPOLIS — Actual testing activities at the Speedway here in preparation for the Memorial Day 500-Mile Race have been delayed by unfavorable weather during the past week. Moreover entrants have been somewhat slower than usual in arriving at the track, this being particularly true of the California contingent.

The Ford powered cars being built in Detroit by Harry Miller are expected to arrive any day now. It is also expected that there will be five new Miller-engined jobs in the race. Two of these are said to have 220 cu. in. engines of identical design and are reported to be the costliest cars to have been built in many years.

One of these jobs will be driven by Wilbur Shaw. It is a front drive and the chassis was laid out by Leo Goosens, formerly with Harry Miller. The other is a rear drive designed by Joseph Thompson, who formerly worked with the late Fred Duesenberg. The car will be driven by George McKenzie. This job is reported to incorporate new steering and springing, including five shock absorbers per spring. The owner of these cars is Gil Pirrung of St. Louis.

Indications are that an increased number of cars will be fitted with spring covers this year to stabilize spring action.

Murray-Ohio Resumes

Work was resumed this week at the Murray-Ohio Manufacturing Co., Cleveland, following a four-day shutdown last week as a repercussion of the strike at the Chevrolet plants.

Hupp Co. Presidency Goes to Vern R. Drum

Coalition Board Holds First Meeting; Abolish Chairmanship Position

Vern R. Drum was elected president and general manager of Hupp at a meeting of the new board of directors Tuesday. Mr. Drum, who has been in charge of production at the Hupp plant, came from the Houdaille-Hershey Co., and formerly was with the Chrysler Corp.

The position of Chairman of the Board, which had been held by Archie M. Andrews, was abolished. George L. Schein and Joseph Cohen, counsel for the corporation, were asked to notify Judge Moinet that all litigation has been disposed of satisfactorily. Hearings in the recent struggle between Mr. Andrews and J. Walter Drake, a former Hupp chairman, for control of the corporation had been held before Judge Moinet who guided the opposing factions into agreement on a coalition board.

Mr. Andrews was in Washington this week attending the hearing before the SEC on the New York Stock Exchange's application to delist Hupp stock.

The new Hupp board is composed of Archie M. Andrews, J. Walter Drake, Frank S. Lewis, Vern R. Drum, William B. Mayo, Harvey Campbell, Alex J. Groesbeck, Hal H. Smith and Seward L. Merriam.

Evelyn Elizabeth Bohn

Evelyn Elizabeth Bohn, daughter of Mr. and Mrs. Charles B. Bohn, died last Monday at Grace Hospital, Detroit, of peritonitis.

FTC Charges Birmingham Jobbers Assoc. Fixed Prices to Suppress Competition

Suppression of price competition in the jobbing of automobile parts and accessories in the Birmingham, Ala., territory is alleged in a Federal Trade Commission complaint against Birmingham Automotive Jobbers Association and its officers and members, who are said to constitute a majority of this class of jobbers and to occupy a dominant position in that territory.

Charging the respondents with seeking to bring about elimination of price competition among themselves, the complaint says that in September, 1933, they entered into an agreement, combination or conspiracy to fix and maintain uniform prices, and since that time have carried it out in their sales to dealer-customers, garage and fleet owners and others.

They agreed, according to the complaint, to use manufacturers' resale schedules and to fix uniform prices for automotive parts and equipment, repair jobs involving only labor, and repair jobs involving both automobile parts and labor. They also fixed schedules of discounts to be allowed by them to certain classes of purchasers of parts and accessories and, the complaint says, agreed to require certain classes of purchasers to resell parts and accessories bought from respondent members at list prices of the manufacturers or at prices fixed by the association. They are said to have agreed that whenever a member should see fit to change a price on a part, accessory or on labor, except on close-out items, he should notify either the association secretary or each member before the change should be put in effect.

Besides the association itself, the complaint lists the following officers as respondents: G. E. Woodward, president of the association; M. H. Johnson, vice-president; A. J. Seigal, second vice-president, and Oliver Henderson, secretary-treasurer, all of Birmingham.

The following members are also named as respondents: Alabama Auto Parts Company, Auto Electric and Carburetor Company, Birmingham Electric Battery Company, Cruse-Crawford Wheel and Rim Company, Lawson Auto Parts Company, Southern Bearing and Parts Company, A. J. Brown trading as Simplex Piston Ring Company, all of Birmingham; and A. D. Slye trading as Slye's Auto Supply Company, of Ensley, Ala.

All respondents are given until Friday, June 14, to show cause why there should not be issued against them an order to cease and desist from the practices alleged.

Vesper Gets Letters from Sloan and Chrysler Backing Liquidated Damages

The position of the General Motors and Chrysler Corporations on aspects of the enforcement of the dealer Code have been outlined by Alfred P. Sloan, Jr., and Walter P. Chrysler, respectively, in letters to F. W. A. Vesper, chairman of the National Control Committee of the Motor Vehicle Retailing Trade.

Mr. Sloan stated that the corporation would support liquidating damage contracts so far as its Buick, Chevrolet, Oldsmobile and Pontiac dealers were concerned. Cadillac-LaSalle dealers were not included, it was stated at GM headquarters in New York, because the details had not been worked out on these lines. While Mr. Sloan's letter is reproduced herewith, Mr. Chrysler's was not available up to press time but it is understood to have given support to the liquidating damage contracts with certain provisos as to the make-up of local agencies passing on cases of alleged violation of such contracts.

In his letter, Mr. Sloan affirms the corporation's belief in the necessity for stabilizing used car prices and recognizes the need for manufacturer cooperation in attaining this end. He points out, however, that cooperation of all manufacturers is essential, but says that GM is loath to move in this direction in view of the uncertainties regarding NRA. He also emphasizes the doubtful legality of positive cooperation between manufacturers and dealers on the Code.

Mr. Sloan's letter follows:

"You will recall that we were discussing once more when you were here yesterday the position of the automobile manufacturer, and General Motors in particular, to the Code, with specific reference at the moment to what we termed 'liquidating damage contract.'

"We told you, the same as I have told you many times during the past year, that we believe in the stabilization of used-car prices and an equitable level. Again, we feel it is going to be difficult, if not impossible, to accomplish this objective without the support of the manufacturer. Still again, that it will require concerted action on the part of the manufacturers; i.e, no one manufacturer can do it alone. Support, according to my thinking, means more than a declaration of policy. It means insisting that the policy be carried out. A neutral position means nothing. A position must be a positive one.

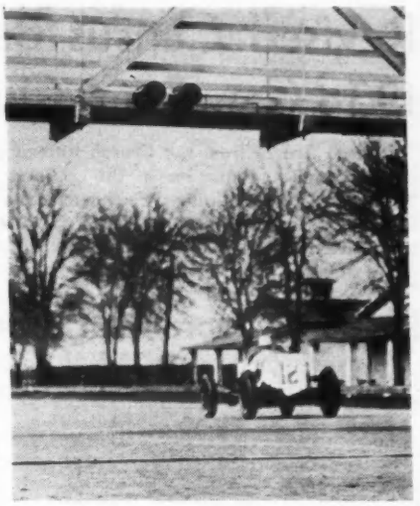
"We have felt, as we explained to you, loath to urge upon our own organization or seek aggressive cooperation from other manufacturers, in view of the great uncertainty that exists, as to the legality of what is being done. Now, superimposed on it is the trend of thinking against even continuing the possibilities that are, at the moment, open to us. I am not talking so much as to the legality of the Code as I am the legality of positive cooperation between the manufacturer and the dealer with respect to the Code. These questions are entirely different but, in my judgment, they are both essential to the solution of the problem.

"As I have told you, it looks at the moment as if, within the next forty-five days, we could see more clearly as to what the rules that are to govern us in the future were going to be. You state that inaction during that relatively short interval of time is highly undesirable and that it would be helpful to the general cause if we show our belief in the liquidating damage agreement by subscribing to it so far as our retail dealer outlets are concerned.

"We have canvassed the situation since yesterday, and are prepared to say to you that, so far as the retail dealer outlets of Buick, Chevrolet, Oldsmobile and Pontiac are concerned, we are prepared to do that very thing, and we will do it, as evidence of our desire to cooperate in the first place, and, second, as evidence of our belief in the objective that you are working for and the willingness to actively cooperate if a foundation in fact exists."

Nash Shipping by Water to Avoid Delays by Rail

After a lapse of four years, Nash Motors has resumed shipping cars to the East by lake and rail to avoid delays in the Chicago railroad terminal bottleneck. A special train of 40 carloads was shipped to Milwaukee by rail last week, there to be loaded on a Pere Marquette carferry for Frankfort, Mich., where the train was reassembled and later disassembled for various eastern destinations.



The new electric traffic signals on the Indianapolis Speedway which will be used for the first time in the Memorial Day classic this year

Payton Urges Dealers Aid NADA in Profits Survey

The NADA national survey of dealer profits will be audited by Ernst & Ernst and that organization, as well as Edward Payton, who made the Pennsylvania survey, and other agencies will act as consultants in developing the final findings.

This announcement was made by association headquarters following a meeting last week of local and state association managers with Messrs. Vesper and Frost. At the same time a statement by Mr. Payton was issued in which he urged all dealers to fill out the original forms as well as a supplemental form which is being distributed.

It is understood that the supplemental forms call for the number of employees, number of new cars sold at wholesale, new car wholesale volume, cost of wholesale cars, expense wholesale cars, discounts allowed to buyers of clean-up cars, finance reserves, total assets, fixed assets, receipts from junker fund. These cover Mr. Payton's criticisms of the original forms since he objected particularly that they provided for the inclusion of wholesale gross profits, but not for wholesale sales and expenses incident thereto.

At the meeting, Mr. Vesper read letters from Walter P. Chrysler and Alfred P. Sloan, Jr., outlining the attitudes of their respective organizations on the dealer code. The contents of these letters are reported elsewhre in this issue. Mr. Vesper also described in detail the present status of his efforts to get increased discounts for dealers. At the conclusion of the meeting, a resolution was adopted commending the NADA and its staff for their efforts in the behalf of dealers.

The association has retained Wayne Hearne to do field work and he will be available to air state associations. It was also announced that NRA Planning and Research Division had agreed to use the material obtained by the profit survey as the basis of an independent study of dealer operations.

General Motors April Sale of Cars Trucks Tops All Months Since 1929

General Motors sold more cars and trucks in April than in any month since 1929. Moreover, its sales to dealers in the first four months of this year were also the largest since 1929 while sales to consumers in the United States were best for the period since 1930. The actual figures presented in comparative form for 1935 and 1934 follow:

	April, 1935	March, 1935	April, 1934	Four Mos., 1935	Four Mos., 1934
Sales to world dealers	184,059	169,302	153,954	572,775	470,558
Sales to U. S. dealers	152,946	132,622	121,964	454,202	370,234
Sales to U. S. consumers	143,909	121,691	106,349	402,002	286,872
Increase in U. S. dealer stocks	9,037	10,931	15,615	52,200	83,362
Sales to foreign dealers	31,113	36,680	31,990	118,573	100,324

Revised Census Bureau Figures Fix 1934 Car, Truck Output at 2,870,001

Revised figures from the Census Bureau of the Department of Commerce on passenger car and truck production in this country and Canada for 1934 fix the final total at 2,870,001. The preliminary estimated total was 2,895,629. In the passenger car division the preliminary total was 2,282,637 and the revised figure is 2,270,457. The original total given for truck production was 612,992 and the revised total is 599,544. Complete monthly figures with final totals are shown in the accompanying table.

Revised Motor Vehicle Production—1934

(U. S. and Canada)

	Passenger Cars		Trucks		Total Motor Vehicles	
	Old	Revised	Old	Revised	Old	Revised
Jan.	118,598	117,700	45,213	44,870	163,811	162,570
Feb.	194,767	193,875	45,511	44,952	240,278	238,827
Mar.	287,010	291,546	58,433	61,068	345,443	352,614
April	304,482	303,806	68,626	67,532	373,108	371,338
May	290,269	290,268	61,544	60,348	351,813	350,616
June	272,662	272,090	49,308	48,292	321,970	320,382
July	232,275	231,501	45,415	44,546	277,690	276,047
Aug.	190,825	190,825	53,889	53,890	244,714	244,715
Sept.	128,120	129,251	46,330	46,335	174,450	175,586
Oct.	86,628	86,128	49,643	49,643	136,271	135,771
Nov.	46,608	50,072	33,554	35,107	80,162	85,179
Dec.	130,393	113,395	55,526	42,961	185,919	156,356
Total....	2,282,637	2,270,457	612,992	599,544	2,895,629	2,870,001

Motor Labor Trouble Slows Steel Shipping

Postponements Not Viewed As Cancellations; Little Change in Buying Tempo

Labor disturbances in automobile plants caused more uneasiness in the steel market than actual postponements of shipments. The operating rate of finishing plants dipped, but how much or how little of that was due to requests from affected motor car and parts manufacturers to defer shipments, and how much to a slowing down in specifications from well-stocked consumers is problematical. It is certain that what relatively few instructions to hold up shipments were received by steel sellers were followed in a spirit of accommodating customers and that none of these requests were looked upon in the light of potential cancellations.

Quite a few buyers who have full-finished automobile sheets due them refrained from asking delayed shipments, so that they might not run the risk of disappointments when they need the material.

Just what effect these developments will have on third-quarter prices remains to be seen. Much as some producers would like to see an advance in cold-rolled sheets, the general impression in the market this week is that price-filing, scheduled to begin May 21, with the opening of order books on June 1, will reveal an unchanged market structure all around. This expectation is based on a preponderance of opinion that there is hardly likely to be so much of a change in basic conditions in the next three weeks that resistance on the part of automotive consumers to price advances would not be forthcoming and make itself most unpleasantly felt.

As the outlook is now shaping, steel producers do not look for very much of a change in the buying tempo until the final period of the third quarter. If the code set-up is left pretty much as it is today, buyers would then have an opportunity to cover their fourth quarter needs to some extent at old prices and improved business conditions might then furnish a more substantial basis for mild, upward price revision. While steel company stockholders, as a whole, so far are by no means getting normal dividend returns, the industry has worked itself out of the red and executives counsel moderation in the matter of prices, lest the pace retard rather than hasten the return of prosperity.

Pig Iron—There has been a downtrend in shipments of pig iron from Lake furnaces to automotive foundries, most of which are well supplied for their current melting programs. The price situation is entirely unchanged.

Copper—An indication of less artificiality in the "Blue Eagle" price of 9 cents, delivered Connecticut, is seen in the steady advance in prices quoted for electrolytic in the "outside" market. Today the "outside" market price is 8.15 cents, while a few months ago 7½ @ 7¾ cents was the range.

Tin—With London and Singapore closed on Monday in observance of King George's Silver Jubilee, the New York tin market was a quiet affair, spot straits being quoted at 50.60 cents. The McReynolds bill, which would impose a 6 cents per pound processing tax on tin, has been placed on the legislative "must list."

Construct New Building for Toledo Stamping Co.

Work has started on a new $100,000 plant for the Toledo Stamping & Manufacturing Co., on the site recently purchased by Jeremiah Bingham. Mr. Bingham will finance the building of the plant for the company, according to Edwin Tasker, president. The plant will be 200 by 170 ft., one-story brick and steel and adjoins the International Harvester Co. branch plant. It is to be completed July 1. The company which does stamping work for Detroit motor car makers has been located in part of the old Bock Bearing plant in Toledo since it was organized.

Farm Groups Ask Congress to Revise Eastman Bill

WASHINGTON, May 1—Major farm, dairy and livestock organizations today asked Congress to revise the form of pending legislation designed to place interstate highway transportation under Federal control.

A joint statement setting forth this request was signed by representatives of the following organizations: The National Grange, the American Farm Bureau Federation, National Dairy Union, National Cooperative Milk Producers Federation, American National Live Stock Association, National Live Stock Marketing Association, National Association of Retail Druggists, and the Wyoming Wool Growers Association.

The statement calls for division of the so-called Eastman Bill, recently passed by the Senate, into two measures. One of these would deal with regulation of interstate passenger bus operations, to which there is little or no opposition. The other would be confined to proposed interstate truck control, which is strongly opposed by the farmers and allied groups.

Olander So. Bend Lathe Works Sales Engineer

A. C. Olander has joined the South Bend Lathe Works as sales engineer. For the past several years Mr. Olander has been connected with the Studebaker Sales Corporation as assistant to the sales promotion and advertising manager.

AMA Asks Elimination of Dangerous Radiator Caps

Installation of dangerous radiator ornaments as standard equipment on new motor vehicles is disapproved in a resolution adopted by the AMA executive committee, acting on the recommendation of the newly organized Safety Traffic Committee.

Recognizing that ornaments of the type which have points or edges extending forward on the radiator cap in such a manner as to cut or pierce a person struck by them, constitute a needless hazard, the executive committee asks member companies to refrain from installing such ornaments as original equipment on their cars.

Paul G. Hoffman, president of Studebaker, is chairman of the Safety Traffic Committee. Other members are: Robert P. Page, Jr., Autocar; R. P. Fohey, Chrysler; Lee J. Eastman, Packard, New York; Paul Garrett, General Motors; Norman Damon, Secretary.

Earlier New Models Move Up Parts Buying Season

With probability of two car announcements before July and industry-wide announcements before the end of October, peak of parts production and raw materials demand will be shifted into the summer months. Installation of new equipment is in progress right now and will continue. Factory executives will have their hands full during the next few months getting ready for delivery of cars before the show in November. Probably no vacations will be obtained this summer unless people can take them during May and June. Rumor has it that one advertising agency has canceled all late vacations in anticipation of car announcements and incident publicity.

Chevrolet Opens Service Schools to Promote Safety

Chevrolet has launched a national safety educational campaign through the organization of two-day service schools in each of its zones throughout the country for the instruction of dealer service men in safety maintenance. This is the third General Motors unit to adopt a plan for enlisting its dealers' cooperation in a safety promotion campaign, the others being Oldsmobile and Pontiac.

The schools will begin with sessions at each of the nine regional headquarter cities and will be attended by the 43 zone service managers. Then in each zone the field organization will take the two days' intensive instruction. The schools will then be taken to gatherings of service men, one man being allowed from each dealership, in groups of 10 until the entire dealer list has been covered.

Seek Extent of Property W-O Pledged Against Bonds

Hearings have started before George Bryce, special master, named by the Federal court at Toledo to determine the extent of Willys-Overland property, which is security pledged under the mortgage securing the outstanding $2,000,000 of bonds of the company.

Early testimony was brought out by attorneys for the National City Bank, trustee, to the effect that the company itself sought to bring about the receivership. Creditors claim that property acquired after the mortgage was put on, under Ohio law, is not included in the security for the mortgage. Bondholders are seeking to show that the company pledged itself to take no action to impair their lien.

Feb. Gas Consumption Up

Gasoline consumption for February, according to the American Petroleum Institute, was 1,074,587,000 gallons compared with 1,038,172,000 gallons for the same month of last year. The daily average consumption was 38,378,000 gallons against 37,078,000 gallons for the same period of 1934. The January-February consumption for this year was 2,220,576,000 gallons which compares with 2,199,982,000 gallons for the same two months of last year.

US to Test Propeller Belt Drives in Planes

The Bureau of Air Commerce of the Department of Commerce has entered into a contract with the Casey Jones School of Aeronautics, Newark, N. J., to investigate the possibility of using a belt drive in an airplane from the engine to the propeller.

In the adaptation of the automobile engine to aviation purposes, a contract for which has already been let by the Bureau of Air Commerce, one of the difficult and expensive modifications required is that of the necessary gearing to be interposed between the engine and the propeller. This gearing not only increases the weight of the engine considerably but also may add almost 50 per cent to the cost of the engine. In an effort to circumvent this difficulty, the belt drive experiment is being undertaken.

The contract, in addition to calling for an investigation of belt drives, includes a 300-hour endurance test on a well-known automobile engine under the conditions which the engine will be required to meet in the air.

Development of Drafting Room Standards Proposed

Proposals covering arrangement of views, lines and line work, sectional views, dimensioning, screw thread representation, trimmed sizes and lettering for an American standard for drawings and drafting room practice has been submitted to the ASA under the sponsorship of the ASME and SPEE.

January-March Automotive Exports Increased 41% Over Corresponding Three Months of 1934

	March				Three Months Ended March			
	1935		1934		1935		1934	
	Number	Value	Number	Value	Number	Value	Number	Value
Automobiles, parts and accessories	....	$25,018,471	....	$20,641,008	....	$62,749,099	....	$44,662,283
Motor trucks, buses and chassis (total)	8,820	4,550,357	10,076	4,570,833	22,176	11,608,580	23,688	10,632,820
Under one ton	640	220,095	1,129	361,783	1,745	600,048	2,300	692,196
One and up to 1½ tons	6,811	2,999,066	7,584	3,032,353	16,685	7,412,388	18,645	7,462,911
Over 1½ tons to 2½ tons	1,094	899,622	1,125	864,885	3,092	2,430,679	2,200	1,777,809
Over 2½ tons	234	388,635	186	282,630	551	1,094,456	463	661,097
PASSENGER CARS								
Passenger cars and chassis	20,986	11,105,171	16,141	8,317,917	47,088	26,435,968	28,698	15,801,858
Low price range $850 inclusive	19,910	9,904,296	15,171	7,240,990	43,599	22,524,619	26,401	13,172,235
Medium price range over $850 to $1,200	792	759,620	691	649,526	2,556	2,451,797	1,439	1,375,235
$1,200 to $2,000	138	211,029	157	255,900	410	640,179	452	726,796
Over $2,000	70	194,875	60	154,340	274	719,038	169	446,068
PARTS, etc.								
Parts except engines and tires	....	.....	....	.....	....	.....	....	.....
Automobile unit assemblies	....	6,105,661	....	4,731,579	....	16,019,148	....	10,770,906
Automobile parts for replacement (n.e.s.)	....	2,306,604	....	2,027,077	....	6,060,109	....	5,236,752
Automobile accessories (n.e.s.)	....	279,826	....	302,332	....	759,355	....	654,102
Automobile service appliances	....	446,753	....	234,037	....	932,101	....	504,312
Airplanes, seaplanes and other aircraft	51	1,104,460	21	304,896	97	2,782,593	67	937,392
Parts of airplanes, except engines and tires	....	482,620	....	198,762	....	1,124,852	....	711,051
INTERNAL COMBUSTION ENGINES								
Stationary and Portable: Diesel and semi-Diesel	29	118,934	3	3,858	98	224,147	34	76,568
Other stationary and portable:								
Not over 10 hp	610	44,521	353	24,121	2,165	129,729	881	65,046
Over 10 hp	147	66,734	111	50,094	335	209,189	231	170,970
Automobile engines for:								
Motor trucks and buses	246	45,986	199	19,718	632	103,907	532	67,578
Passenger cars	2,852	177,767	4,156	256,815	7,622	494,097	7,707	465,386
Aircraft	54	131,501	105	520,641	108	321,980	295	1,269,765
Accessories and parts (carburetors)	....	135,602	....	125,341	....	372,375	....	308,626
IMPORTS								
Automobile and chassis (dutiable)	32	9,198	36	12,594	105	61,485	112	49,260

Workers Reject Chevrolet Proposals

(*Continued from page* 621)

the organization late last week of the Independent Workers' Society, consisting of employees who were not responsible for the strike and who regarded the company proposals as acceptable. A meeting of this Society was held Saturday with about 1600 present including a hundred or more union strikers who heckled and hooted during the proceedings. The upshot of the meeting was that 1400 signed a petition to the management asking that the resumption of work be hastened. A motion also was adopted asking for an orderly election by secret ballot to be taken among all employees on the proposal of the company. These developments jolted the union leaders who, after conferences on Sunday, requested the Department of Labor to hold a poll.

Mr. Dillon made it plain that the unions were through with the Automobile Labor Board in asking to have the Department of Labor run the election. He also said that if the majority accepted the company proposals, the strike would be called off, but if the proposals were rejected, negotiations would be resumed.

The rather ticklish question of who should hold the election was clarified by Mr. Knudsen when he stated, "We have not in any way changed our relationship to the Automobile Labor Board, and will continue to operate under the President's settlement of March 25, 1934. . . . There is nothing in the poll that commits the company to further negotiations."

The poll followed campaign meetings by both groups on Monday and Tuesday, with Fred Seiger, leader of the independent group, asserting that important concessions by way of interpretations of the company proposals had been obtained at Sunday conferences with Chevrolet President M. E. Coyle and other officials in Detroit. These interpretations would make the increases offered run from 5 to 20 per cent. The company is said to have agreed also at these conferences that all men would be taken back and that the independents would be included in any shop committee conferences in the future.

The most dramatic feature of the Saturday meeting staged by the independent group was the entrance of Bert Conway, former manager of the Chevrolet plant here, who got up from a sick bed to attend the meeting. He was a bit shaky on his feet and talked in measured words, but the surprise of his coming, his talk as a Toledoan no longer connected with General Motors, and his intimate story of how he had tried to help the men this year together with frank admission of some of the difficulties of plant, won respectful attention. He was given a big ovation when he appeared and when he finished.

Mr. Conway said he had worked in industry from age of 13 years, had educated himself, knew the problems of men and foremen, and had made it his guiding principle to try to do everything possible for the men in the plant.

He said his physical breakdown had been due in most part to his long hours of work in trying to operate the plant this year so that every workman would average about 2080 hours instead of the 1400 hours averaged last year.

A year ago he recounted how an extra shift of 800 men was kept on for a few weeks at the peak. It did them no good and cut the hours of all the rest of the workers, he said. This year it had been his plan to spread out the work.

He told them that General Motors would play fair with them on any proposal.

* * *

WASHINGTON—Charlton Ogburn, counsel for the United Automobile Workers, A. F. of L. affiliate, issued a statement here that the strike at the Chevrolet plant in Toledo must be settled by a new Automobile Labor Board and not by the Board set up by the President. The Wolman Board, the Federation said, is "washed up" and organized labor is "through with it."

April Biggest Since 1929

(*Continued from page* 621)

around 325,000 passenger cars. With most of its assembly branches down due to labor troubles, Chevrolet, of course, is experiencing a shortage of field stocks which had not quite reached the desired level before the strike broke out.

Hudson-Terraplane

April sales of Hudson and Terraplane cars exceeded those of March by over 2000 cars, a gain of more than 30 per cent and higher than any month since April, 1931. An intensive sales drive during the current month, backed up by a vigorous newspaper advertising campaign and prize contest, is already indicating that May may be even better than April, the company reports. Cash and merchandise prizes amounting to $25,000 are being distributed among the sales organization in the drive.

Dodge

During the week ended May 4, Dodge dealers delivered 7773 cars and 1303 trucks, a total of 9076 units, compared with 9243 in the preceding week. In the first 18 weeks of this year a total of 122,780 units have been delivered by Dodge dealers against 76,589 in like 1934 period. Used car sales increased to 8700 last week from 8189 in the week before.

Chrysler

More Chrysler cars were delivered at retail in week ended May 4 than in any week since July, 1931, the total of 1275 showing an increase of 57 cars over the preceding week. Chrysler dealers also delivered 3913 Plymouths, making the total for the week 5188 units or 55.3 per cent over the corresponding week last year. With a total of 67,067 units, the first 18 weeks show a gain of 54.3 per cent in deliveries of Chrysler and Plymouth cars by Chrysler dealers.

Oldsmobile

Oldsmobile dealers delivered 18,554 cars in April, a new record, and more than were delivered in the first four months of 1934. The final ten days of the month accounted for 6272, which was within three cars of equalling the number shipped to dealers during the period. Deliveries for the year to date were 51,916, or nearly three times the volume of the similar period last year. April production of 20,311 cars brought output for the first four months to 64,557 cars compared with 26,309 a year ago.

Packard

With May production being maintained at the rate of 6100 cars for the month, Packard is exceeding all previous production records. The plant for building the new 120 car is nearing capacity. The biggest previous production month was October, 1928, when 5548 cars were built, and the year resulted in an output of 49,598 cars.

Last Tuesday's shipments of 333 cars sets a new daily record, comparing with 303 on Aug. 30, 1929, the previous high. Orders continue to increase faster than production and unfilled orders now total 8836 exclusive of unreported orders held by distributors and dealers, according to M. M. Gilman, general manager. Since the first of the year Packard has produced 9270 cars. Up to May 1 last year 7071 cars had been produced. Demand for the new lower-priced car has been accompanied by increased sales of the larger Packards, of which deliveries to May 1 totaled 2125 against 1814 in the same 1934 period. Production of the big cars is at the rate of 600 a month with indications from the field that a higher output will be necessary. Second quarter production plans call for the building of 16,500 of the 120 cars alone.

Cadillac-LaSalle

Factory shipments of 3031 Cadillac and LaSalle cars in April exceeded any month since September, 1930, and made the biggest April since 1929. The gain over March of this year was 89 per cent and over April last year, 22.4 per cent. Two-thirds as many cars have been shipped in the first four months this year as in all of 1934, and May shipments should equal or exceed those of April. Despite heavy shipments, the bank of approximately 3000 unfilled orders increased slightly during April. Final reports on retail sales are not available as yet but field indications are that deliveries are matching factory shipments and April is expected to show the best volume since April, 1931.

Pontiac

April production of 18,749 Pontiac cars brought the total output of 1935 models to 70,558, or 92 per cent of the entire 1934 model production of 76,553 cars. Present rate of operations indicates that the 1934 total will be passed by the middle of the present month. Domestic retail deliveries in the first four months of 50,939 Pontiacs compared with 24,973 in the similar period of last year. The company has set a goal of 150,000 deliveries for 1935, or more than twice last year's volume. April deliveries of 16,677 compared with 16,137 in March and 9809 in April last year.

Graham

Graham-Paige has entered upon an extensive campaign to double its sales volume over the next four months. Some 70 district representatives attended a factory sales conference last week and discussed plans for the campaign which is to be known as the "Victory Drive," in which dealers and salesmen will compete for special bonus prizes. The Graham Master Salesmen's Club was organized along the lines of the Graham Legion which has existed for several years. Graham has added 350 new dealers since January.

Plymouth

Plymouth sales continued at close to record heights last week when deliveries totaled 9972, an increase of 40.3 per cent over the corresponding week of last year, but down slightly from the peak of 10,055 deliveries in the preceding week. Plymouth sales to date total 136,915 units compared with 96,639 in the like period of last year. Plymouth dealers sold nearly 20,000 used cars during the week ended May 4.

First Quarter Earnings

Car Companies	1935	1934
10 companies reported	+$37,934,922	+$32,872,164
Mack Trucks	— 187,018	— 29,647
Total—11 companies	+$37,747,904	+$32,842,517
Parts Companies	**1935**	**1934**
26 companies reported	+ $9,708,942	+ $5,124,081
Hayes Body	— 49,484	— 13,567
Clark Equipment Co.	+ 23,273	+ 118,560
Timken Roller Bearing	+ 2,361,937	+ 1,278,199
Tung-Sol Lamp	+ 107,927	+ 94,141
Total—30 companies	+$12,152,595	+ $6,601,414

Science Leaders Confer At Greenfield Village

Beneath the tower of the replica of Independence Hall in Henry Ford's Greenfield Village, members of the conference on agriculture, industry and science, held Tuesday and Wednesday in Dearborn, Mich., proclaimed and signed a "Declaration of Dependence upon the Soil and of the Right of Self-Maintenance."

Signed by outstanding leaders in agriculture, industry and science, the document has been described as a "Declaration of Economic Independence of the United States," heralding the beginning of a new era in American progress. It sets forth the aims and purposes of the convention which may be summarized as the working out of a correlation between industry and agriculture with the aid of chemistry to solve the problems of over-production and unemployment.

Dearborn was chosen for the first conference as a tribute to Henry Ford, pioneer in the field of developing and adapting farm products to industrial uses. The Chemical Foundation, National Grange, American Farm Bureau Federation and National Agricultural Conference are sponsors of the conference.

Among the speakers were C. F. Kettering, president of General Motors Research Corp.; W. J. Cameron, Ford Motor Co.; Irenee DuPont, vice-chairman, E. I. DuPont de Nemours and Co.; Francis P. Garvan, president, Chemical Foundation; R. H. McCarroll, chemist, Ford Motor Co.; Howard E. Coffin, chairman of Southeastern Cottons, Inc.; Col. Frank Knox, publisher, Chicago Daily News; Louis J. Tabor, Master of the National Grange, and Leo M. Christensen of the Chemical Foundation.

Toledo Parts Makers Ask Steel Code Price Relief

Toledo automotive parts manufacturers have appealed to Washington authorities to aid in eliminating the discrimination against them by steel prices fixed under the NRA code for the steel industry.

Abandonment of the price-fixing power in the code appears to be the only way out, it was announced by Clare B. Tefft, transportation commissioner of the Chamber of Commerce, who interviewed Federal Trade commission, NRA administrators, and Senator R. J. Bulkley and Congressman Warren J. Duffey of Ohio.

The Commercial resolution of the Iron and Steel Institute, which fixes prices for Detroit and outlying districts, sets up the Michigan-Ohio boundary as an arbitrary boundary for the Detroit manufacturing area and despite Toledo's favorable freight rate, steel which is hauled through Toledo from the Youngstown and Cleveland districts is laid down in several small Michigan cities over the border at a lower price than in Toledo.

Continuation of the price discrimination it is contended by Toledo manufactures will result in pushing some companies here out of business.

AFL Grants International Charter to Motor Workers

The executive council of the American Federation of Labor has authorized issuance of charters for international unions in the automotive and rubber industries. Hitherto workers in both groups have been organized in Federal unions, operating directly under the auspices of the A. F. of L. William Green, AFL president, announced this week he would call officials of the rubber unions to Washington shortly for an organization meeting, but would not issue a similar call for automotive unionists until "the situation in that field has clarified." According to Mr. Green there are 176 automobile locals with a membership ranging between 40,000 and 50,000 workers.

Pennsy Station Plane Goes to Ford Museum

The Ford tri-motor plane, long a feature of Penn Station, New York, where it has been inspected by thousands, has been dismantled and is being shipped to the Ford Museum at Dearborn. It was the first tri-motor job to fly the Rockies. The plane was presented to Edsel Ford by its owner, TWA.

Wide Range of Uses Foreseen for New Rubber Protective Coatings Applied in Liquid Form

Kelsan Products, St. Clair, Mich., was revealed this week as the developers of the new process which makes possible the use of rubber protective coatings applied in liquid form. The company has been organized by Frank M. Sanders, one time assistant general manager of the British Dunlop Rubber Company, and P. E. Kelley, who has a background of 30 years manufacturing experience in the rubber industry.

For industrial applications, the development opens up new possibilities in many directions. It is reported for instance that one manufacturer has been experimenting with the possibility of coating a complete automobile body with Kelsanite as it comes out of the paint shop, leaving it on while the body goes over the final assembly line, etc. Consideration also has been given to leaving the coating on during road test, shipment or drive-away, etc., removing it only just before delivery of the car to the final purchaser. Removal of the coating is quite simple, involving merely the loosening of an edge, and then pulling the whole coating off in one sheet, like a cellophane wrapper. The cost of providing this protective coating is said to be nominal considering the saving in refinishing costs.

In the masking of automobiles for lacquering, the use of sprayed Kelsanite permits a reduction in material costs as well as even greater savings in time required.

Another important application is in the protection of finished parts and equipment for shipment or storage. Parts can be sprayed, brushed, or dipped in Kelsanite, thereby sealing the surface against air and moisture, etc.

Used for this purpose, Kelsanite eliminates the laborious unwrapping and cleaning required with present packaging methods, in addition to the reduction in materials cost involved. As a rust preventer in storage of metal parts, Kelsanite coated parts have been subjected to over 150 hours saltspray tests without showing any signs of corrosion.

In the plating of metal parts, Kelsanite is said to have a definite field as a masking compound to prevent deposition of metal except where desired. Following the plating operation, the coating is readily stripped off.

Jan.-March Wholesale Financing Gains 73% Over 3 Months of '34

	Wholesale Financing Volume in Dollars	RETAIL FINANCING (282 Identical Companies) Total Volume and Average			NEW CARS Volume and Average			USED CARS Volume and Average			UNCLASSIFIED Volume and Average		
		Number of cars	Amount	Per car	Number of cars	Amount	Per car	Number of cars	Amount	Per car	Number of cars	Amount	Per car
March, 1935 ..	$145,519,467	254,429	$95,149,152	$374	115,869	$61,695,115	$532	133,407	$31,598,255	$237	5,153	$1,855,782	$360
March, 1934 ..	102,775,967	183,724	69,202,632	377	84,300	46,427,926	551	95,477	21,367,713	224	3,947	1,406,993	356
3 months, 1935.	345,404,280	580,597	217,720,026	375	261,670	140,411,368	537	306,619	72,837,412	238	12,308	4,471,246	363
3 months, 1934.	200,168,927	409,773	149,017,564	364	171,498	94,907,700	553	228,882	50,985,843	223	9,393	3,124,021	333

Business in Brief

Written by the Guaranty Trust Co., New York, exclusively for Automotive Industries

The upward trend of general business activity continued last week. Consumer buying increased; and forward wholesale ordering enabled many branches of industry to maintain their operating schedules, which usually decline at this time of year. Steel operations fell to the lowest level this year.

Car Loadings Decline

Railway freight loadings during the week ended April 27 totaled 558,886 cars, which marks a decline of 52,019 cars below those in the preceding week, a decline of 50,818 cars below those a year ago, and an increase of 20,007 cars above those two years ago.

Food Prices Up 2%

During the two weeks ended April 9 retail food prices increased 2.0 per cent, according to the Bureau of Labor Statistics. Of the six commodity groups included in the index, cereals alone showed no change, while fruits and vegetables increased 6.9 per cent.

Current Output Steady

Production of electricity by the electric light and power industry in the United States during the week ended April 27 was 0.3 per cent above that in the corresponding period last year. Production during the preceding week was 1.7 per cent above that a year ago.

Store Sales Lower

Sales of department stores in the New York Federal Reserve district during March were 13½ per cent below those a year ago. However, this decline was due to the fact that March this year contained one less shopping day and that Easter buying was delayed.

Lumber Makes Gain

New business at the lumber mills continues to gain. The volume booked during the week ended April 27 increased for the third successive week and was the highest for any week since November, 1933. During the period under discussion orders were 32 per cent above those a year ago, while shipments and production increased 26 per cent and 1 per cent, respectively.

Crude Production Drops

Average daily crude oil production for the week ended April 27 amounted to 2,561,400 barrels, as against 2,590,300 barrels for the preceding week and 2,450,250 barrels for a year ago.

Fisher's Index

Professor Fisher's index of wholesale commodity prices for the week ended May 4 stood at 82.1, as against 81.8 the week before and 81.5 two weeks before.

Federal Reserve Statement

The consolidated statement of the Federal Reserve banks for the week ended May 1 showed no change in holdings of bills and securities. There were increases of $20,000,000 in monetary gold stocks and of $30,000,000 in money in circulation.

C. E. Miller, L. H. Diehl Named Young Co. Directors

Charles E. Miller and Lloyd H. Diehl were elected directors of L. A. Young Spring and Wire Corp. at the annual meeting, succeeding Henry Ruen and A. D. Coffin, both employees of the company. Mr. Miller is president and general manager of the Michigan Steel Tube Products, while Mr. Diehl is president and general manager of the Detroit Gasket Mfg. Co. and director of Crown Cork and Seal Co. C. M. Young was elected treasurer, succeeding L. A. Young, who was reelected president. Other officers were reelected.

German Automobile Output Made Big Gain in February

German automobile production during February was the greatest for any month since August, 1934, according to a report of the Commerce Department by Rolland Welch, Trade Commissioner at Berlin. Comparing February with January the report indicated passenger car output increased from 13,461 units to 15,306; truck production moved from 2450 to 2597 units and bus production was 210 compared with 178.

Motorcycle output declined in the small cycle field, while large motorcycle output gained. There also was an increase made in the manufacture of three-wheeled units.

Bendix Corp. Plans Big 3 Day Sales Convention

Plans for the biggest sales convention in the history of the Bendix Products Corp. have been completed, according to Frank B. Willis, general sales manager. The convention is to be staged on May 20-23 and it is expected that more than 300 Bendix distributors will be in attendance.

The convention will open on the morning of May 20, and for three days sales meetings will be held during the business hours and the evenings will be devoted to entertainment. Merchandising in general and in particular will be discussed by sales and economic experts. Advertising will also be discussed by Lloyd Maxwell, executive vice-president of Roche, Williams & Cunnyngham, Inc., and other advertising executives.

A gala entertainment will be held on the night of May 21 at the estate of Vincent Bendix. A golf tournament will be staged on the final day of the convention and a banquet will be held at the South Bend Country Club that night.

Chevrolet Treats Waste To End Stream Pollution

A system installed at the Flint Chevrolet plant for treating waste material discharged into streams to end wholesale killing of fish has proved efficient after a year's trial. The installation was made in cooperation with the Michigan State Department of Conservation and the Stream Control Commission.

The system used at the Chevrolet plant is to accumulate the poisonous waste and treat it to remove the cyanide, the remaining liquid then discharging very slowly into the river. In the operation the waste is accumulated in a rubber-lined steel tank 40 x 5 x 4 ft. Recently 4500 gallons were treated by the addition of more than two tons of sulphuric acid followed by 16 hours of aeration. The released gases are collected under a hood and discharged into the air under forced draft through a stack 60 feet high.

Cope, Former AP Man, Joins AMA at Capital

James Cope has been added to the Washington staff of the Automobile Manufacturers Association. For six years he was with the Washington Bureau of the Associated Press and for the past year with N.R.A., during which he devoted his attention to matters concerning public information and internal administration.

Mr. Cope's duties will be to assist Pyke Johnson who is in charge of the Association's Washington office.

Canadian New Car Sales Up 46% in First Quarter

New passenger car sales in Canada, as shown by official registrations for the first three months of this year, totaled 13,340 units, up 46 per cent over the 9139 total for the first quarter of 1934. Commercial units registered were 2787 units, up 75 per cent, over the 1588 total for the quarter last year. Combined passenger car and commercial sales were 16,127 units, up 50 per cent from the 10,727 total in 1934.

Highway Tax, Regulation Data Compiled in Book

A loose-leaf book entitled "The Highway Source Book—1935" which contains a compilation of the most important data on highways and taxation and regulation of motor transport, was published this week by the National Highway Users' Conference. A comprehensive index is one of its features. The book will be kept up to date by the publication of additional sheets for insertion in the binder.

Wagner Bill Would Make AFL Czar Over Industrial Workers, Reeves Tells USCC

The automotive industry's opposition to the Wagner Labor Relations Bill is based upon the belief that passage of the measure by Congress "would tend to make the American Federation of Labor the czar over industrial and clerical workers, notwithstanding its proved irresponsibility in carrying out agreements," Alfred Reeves, AMA vice-president, told U. S. Chamber of Commerce convention delegates who attended the organization's labor section meeting.

Mr. Reeves continued by saying:

"We hope everyone will recognize the gravity of this attempt to give free play to the A. F. of L. that would mean a union card as a requisite for a man to earn his living.

"The present strike at Toledo is an example of what might be expected if the Wagner bill becomes a law.

"In that case the management met for collective bargaining with union leaders who claimed they represented the employees.

"While these negotiations were in progress and without even permitting the men to vote on the offering of the management, the men were ordered to strike, with the result that thousands of men in other cities well satisfied with their own working conditions are now out of employment.

"This is another evidence of the irresponsibility of labor unions, the most glaring example being the walkout of the American Federation of Labor on the agreement made in March last year with the President of the United States.

"Believing the President set forth fair and equitable rules for the government of labor relations, the Automobile Manufacturers Association and its members asked that fair-minded men support the President and the true cause of labor by urging Congress not to pass any legislation which violates the principles he laid down, including freedom to bargain collectively without discrimination because of union or non-union affiliations, representation in bargaining groups pro rata to the number of men each committee member represents and the declared position that the government favors no particular union or particular form of employee organization or representation, with the government's only duty to secure absolute and uninfluenced freedom of choice without coercion, restraint or intimidation from any source.

"In its demands the union at Toledo called for it to be the sole bargaining agency irrespective of the President's settlement.

"The strike was called in the face of the fact that in accordance with the procedure laid down by the National Automobile Labor Board appointed by the President of the United States, an election to determine accredited representatives of the workers in the Toledo plant was to be held the next day with all arrangements having been made for that purpose.

"Wages at the plant were at the highest level ever paid, on a par with or higher than wages for similar work in that district."

House Committee Considers Federal Gas Tax Abolition

Possible reduction or elimination of the Federal gasoline tax is being considered by the House Ways and Means Committee of which Representative Robert L. Doughton is chairman. Chairman Doughton, with the agreement of other committee members, is quoted as stating: "The Committee undoubtedly will seriously consider abolition of the gas tax."

According to the announcement, favorable action on this tax depends upon whether Congress adheres to the "ordinary budget" estimates of the Government, whether increased income tax revenues continue at their present high level and the fate of the soldiers bonus legislation. Government estimates indicate that the gas tax is expected to raise $185,000,000 in revenue this fiscal year. The Michigan delegation in the House has begun a drive to reduce high automotive taxes, but it is understood the majority sentiment favors slicing gasoline levies ahead of all others in the nuisance group.

GM to Make Transmissions at St. Catharines Plant

A new unit of manufacturing operation for the General Motors of Canada, Limited, has been announced by H. A. Brown, vice-president and general manager at Oshawa, Ont. The company plans complete construction of transmissions in Canada for 1936. The change will mean employment of 150 more men at St. Catharines, Ont. The innovation arose from the Toledo, Ohio, Chevrolet strike and will make Canadian operations independent of labor disturbances in the United States.

Wholesale Financing Gains On Used Car Floor Planning

Available statistics seem to support the assumption that much of this year's big increase in wholesale financing represents money going into used car floor planning, the National Association of Sales Finance Companies says. In the first two months, it points out, there were 66 per cent more motor vehicles sold at wholesale than in the same months of 1934, but wholesale financing showed an increase of 106 per cent over the previous year. "It is hard to believe," the NASFC concludes, "that wholesale financing would increase so much more than sales of new cars unless a considerable proportion of this additional financing was based on used cars."

Labor Costs Cut Bendix Profit on Record Output

Production of brakes and carburetors in the South Bend factories of the Bendix Aviation Corp. during March was the largest in the history of the company. Profits from this increased production contributed to the net earnings of the corporation for the first quarter of 1935 which were higher than any corresponding period in the corporation's history.

Walter J. Buettner, treasurer, said that while local production had increased greatly profit margins were reduced by higher labor costs.

Jenkins to Defend Speed Records With New Car

Ab Jenkins will take a new car, now being built in Indianapolis, to the Utah salt beds this summer in the quest for new speed records, many of which he now holds. Two English drivers and cars are also expected to make record trials on the salt this summer, including G. E. T. Eyston, and John Cobb, who is expected to bring a 745 hp. Napier. In addition, Norman Smith, Australian race driver, is expected.

Spain Puts Automobiles on Restricted Quota

As a corollary to the denunciation of the Franco-Spanish commercial treaty of March, 1934, the importation of automobiles was made subject to import quota restriction in Spain, but the total quota for 1935 has not yet been fixed, according to a cablegram received in the Department of Commerce from Ambassador Claude G. Bowers, Madrid.

CALENDAR OF COMING EVENTS

SHOWS

Machine Tool Show—Cleveland..Sept. 11-21
New York Automobile Show, New York, Nov. 2-9
Buffalo Automobile Show.....Nov. 9-16
Automotive Service Industries Show—Atlantic City .....Dec. 9-13

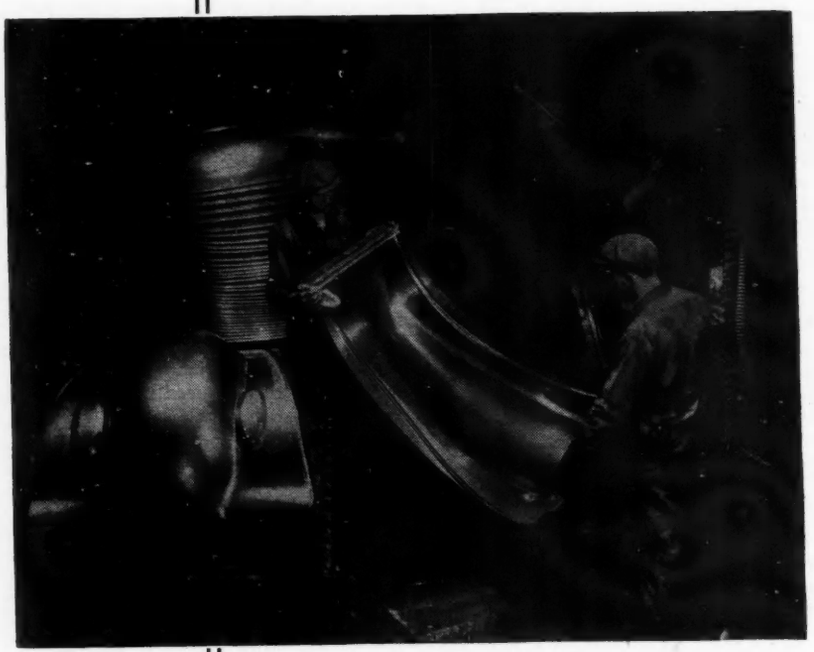
CONVENTIONS AND MEETINGS

American Society of Mechanical Engineers (National Oil and Gas Power Meeting), Tulsa, Okla..May 8-11
Automotive Trade Assoc. Managers Mid-Year Meeting, Washington, D. C. .....May 22-24
Automotive Engine Rebuilders Assoc.—Indianapolis .....May 27-30
S.A.E. Summer Meeting—White Sulphur Springs, Va. .....June 16-20
American Society for Testing Metals, Detroit .....June 24-28
American Transit Assoc., Bus Division, Atlantic City .....Sept. 23
National Assoc. Sales Finance Cos.—White Sulphur Springs.....Sept. 26-28
American Society for Metals, Annual Meeting—Chicago .....Sept. 30-Oct. 4
National Safety Council, Louisville, Ky. .....October 14-18
American Gas Association — Atlantic City .....Oct. 14-18
American Petroleum Institute — Los Angeles .....Nov. 11-14
National Industrial Traffic League—Chicago .....Nov. 20-21

RACES

Race—Indianapolis Race, Indianapolis, May 30

How Pontiac Produces Crowned



Inner section of both right and left front fenders is drawn in one piece. The stamping is sheared in two on the trimming die.

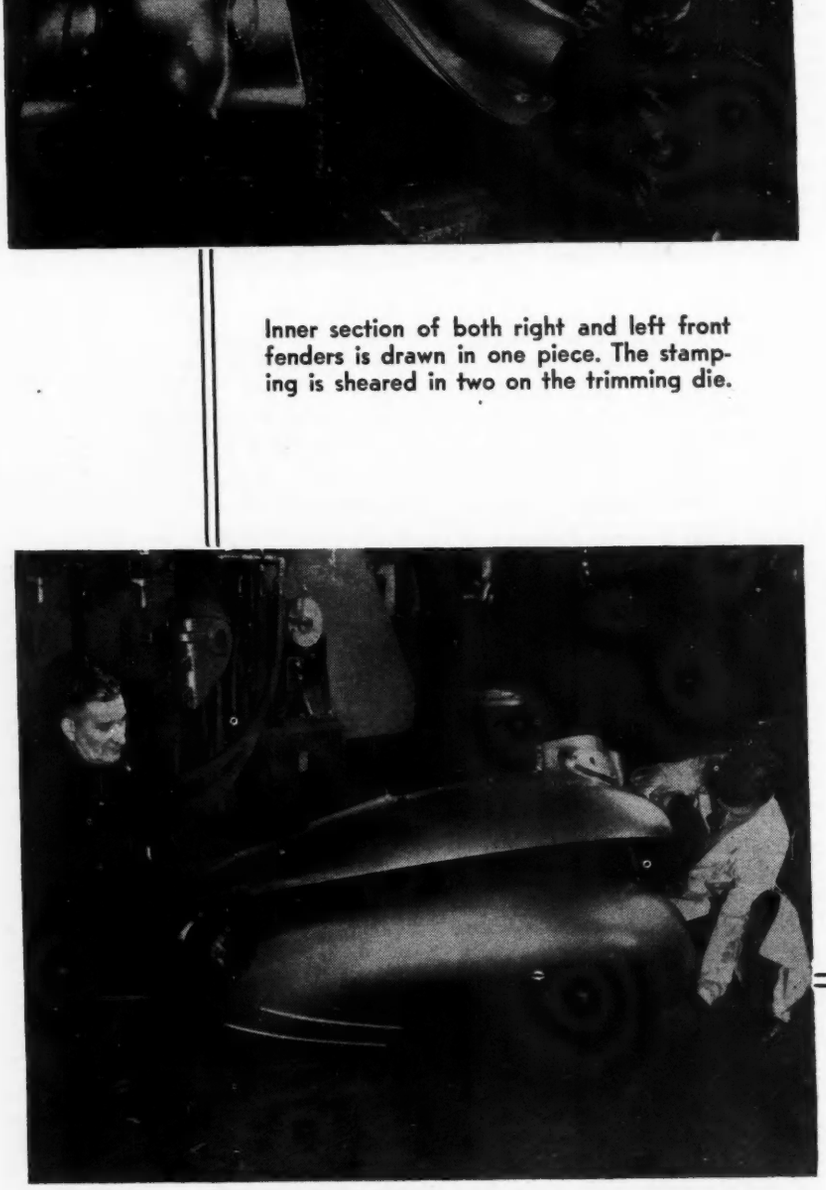
PROMPTED by the adoption of deeply crowned fenders and long skirts, much work has been done recently to develop more economical methods of fender production. Front fenders, for example, already have reached the stage where drawing from a single sheet is no longer generally practicable.

These considerations lend more than usual interest to the methods employed in the manufacture of front fenders for Pontiac cars. Here is a set-up in which the fender is made in two parts, inner and outer sections, joined at the center by flash welding and finished by hand grinding. Fender stock is 19 gauge sheet.

The double stamping consisting of the right and left inner sections is drawn in one operation. Then on the trimming die, it is cut in half by means of a shear which is a part of the die.

It has been found that the most economical means of doing the job is to make the inner section both right and left in one stamping as illustrated. The blank for this stamping is a rectangular sheet 43½ x 89 in. sheared diagonally along both long edges so as to make one end tapered down to a width of 22 in.

Easily the most spectacular operation is the flash welding of the inner and outer sections on Taylor-Winfield machines. Pontiac has a battery of



Inner and outer sections ready for the flash welder which is in the background.

and Skirted Fenders

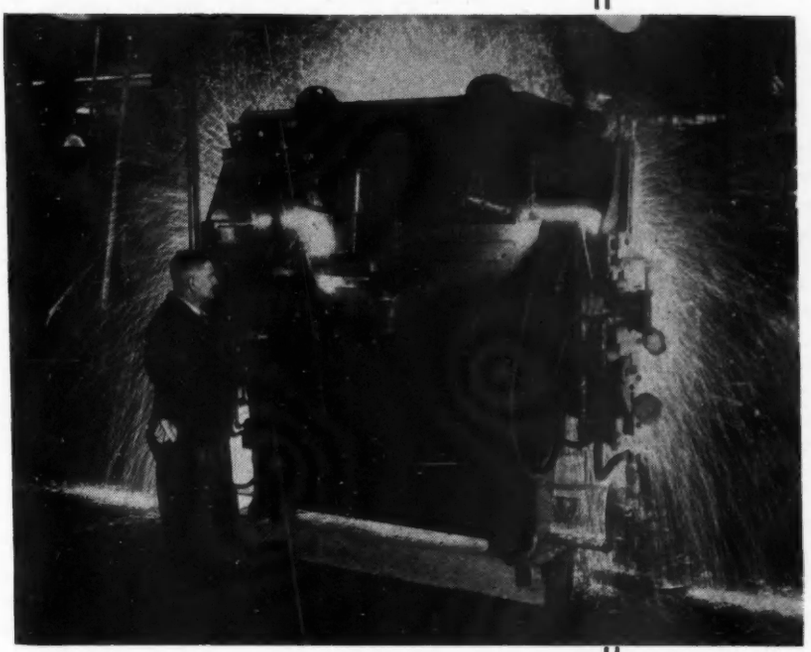
by Joseph Geschelin
Detroit Technical Editor,
Automotive Industries

four such machines specially designed for the purpose, each one having a productive capacity of 80 to 100 fenders an hour. The weld is about 90 in. long and is completed in about 6 to 7 seconds. These welders operate automatically with air cylinder clamping and a motor driven mechanism to draw the edges together., Transformer capacity of the flash welders is of the order of 300 KVA rating.

After welding, the joint is finished both inside and outside by hand grinding with portable tools using carborundum wheels. The rough flash on the inside is removed first, in a shower of sparks that might well rival many welding operations. Great precautions are taken at this point to assure the safety and comfort of the operator. As shown in the illustration, he is equipped with a protective mouthpiece, goggles, cap, leather apron, armlets and gloves. No detail is overlooked.

Following this preliminary grinding, fenders are transferred onto wooden bucks which are built up as a part of platform cars mounted on an oval merry-go-round conveyor. Metal finishers ride these cars while polishing the outside surface with hand tools.

Up to the flash welding operation, the fender stampings require 17 separate steps, 12 on the inner half, five on the outer half, including hand and press operations.



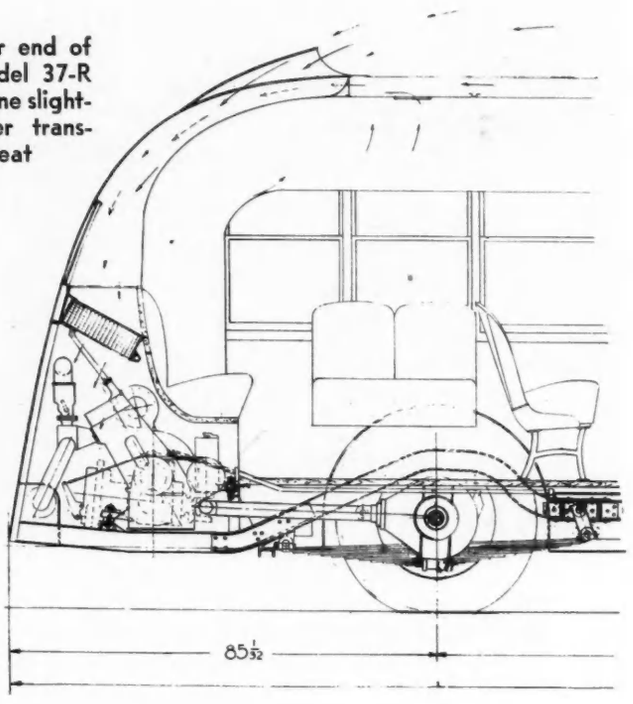
Most spectacular operation in Pontiac fender division is the Taylor-Winfield flash welder. It joins the inner and outer front fender section in a weld line running 90 inches. The outer section may be seen in the foreground.

Beautiful action shot demonstrating what happens when the flash is removed on the inside of the fender. Note particularly the safety devices protecting the operator.

Rear and Under-Chassis Increasingly Popular in

by P. M. Heldt

Engineering Editor,
Automotive Industries



Side view of rear end of Twin Coach Model 37-R bus, showing engine slightly inclined under transverse rear seat

DURING the past few years a good many changes have been made in the design of vehicles for commercial passenger transportation. Perhaps the two most outstanding improvements in motor buses have been the rearrangement of the chassis with the object of increasing the passenger capacity for a given overall length and a given weight, and the attempts to add to the eye appeal of the vehicles by what is generally referred to as streamlining. The old conventional bus with the powerplant arranged centrally in the longitudinal axis of the vehicle in front, as in modern passenger cars, no longer dominates, for most of the new models brought out during the past few years either have the engine mounted under the chassis or else at the rear. In the first case the powerplant does not occupy any space that would be available for passenger-carrying purposes, and in the second case it is at least greatly reduced; in fact, if the powerplant is mounted transversely at the rear of the coach it may be located partly under the transverse rear seat, in which case practically the whole of the body space remains available for passenger-carrying purposes.

The first breakaway from the conventional chassis layout for buses occurred some years ago when Frank Fageol came out with his first Twin Coach, which had two distinct powerplants, one under the longitudinal seats on each side of the vehicle. There are, of course, certain disadvantages connected with the use of two independent powerplants, such as complication of control and greater first cost. However, in the case of the larger, more powerful buses the increase in the cost of powerplants is not very great, because the smaller engines required are of about the same size as those used in light trucks, which are produced on a large scale, whereas the scale of production of engines of about twice that size is much smaller, and the cost of production therefore materially greater.

This first departure from the former conventional chassis layout was soon followed by others, in some of which the engine was arranged transversely

Twin-Coach Model 37-R bus

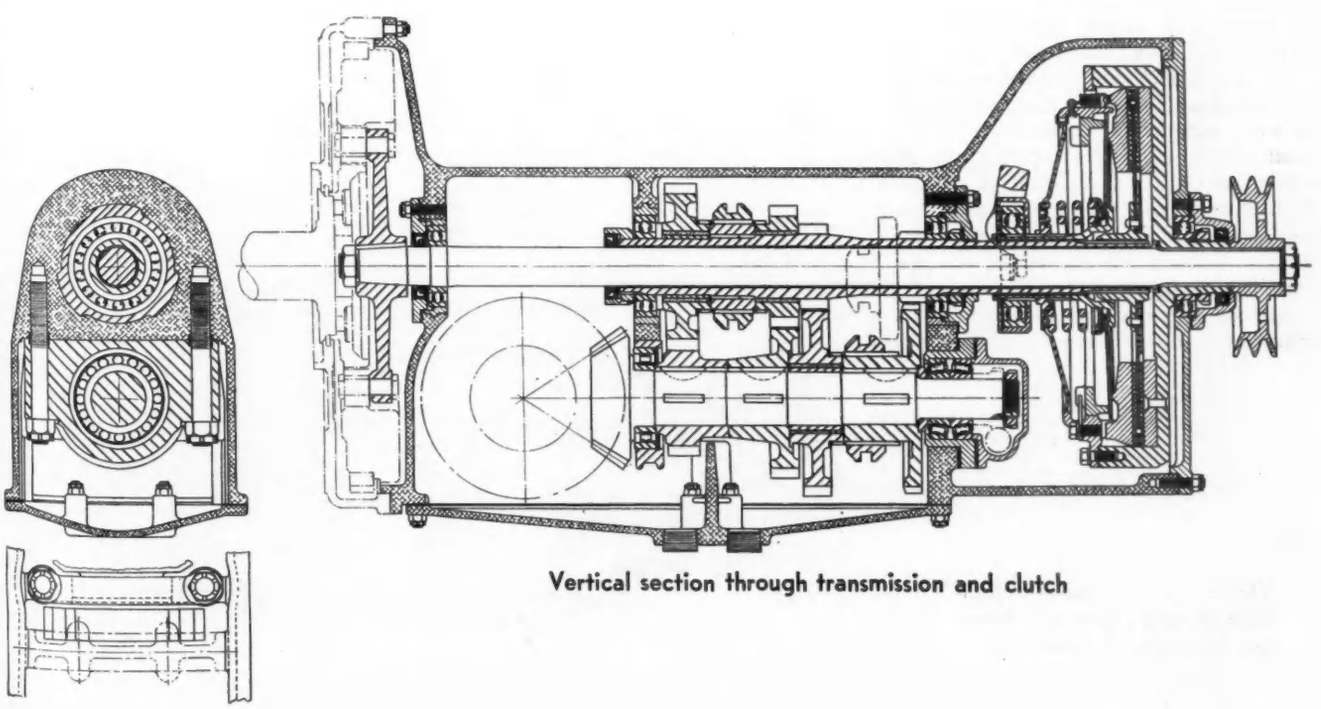
Mounted Engines Motor Bus Field

Twin-Coach Model 23-R bus

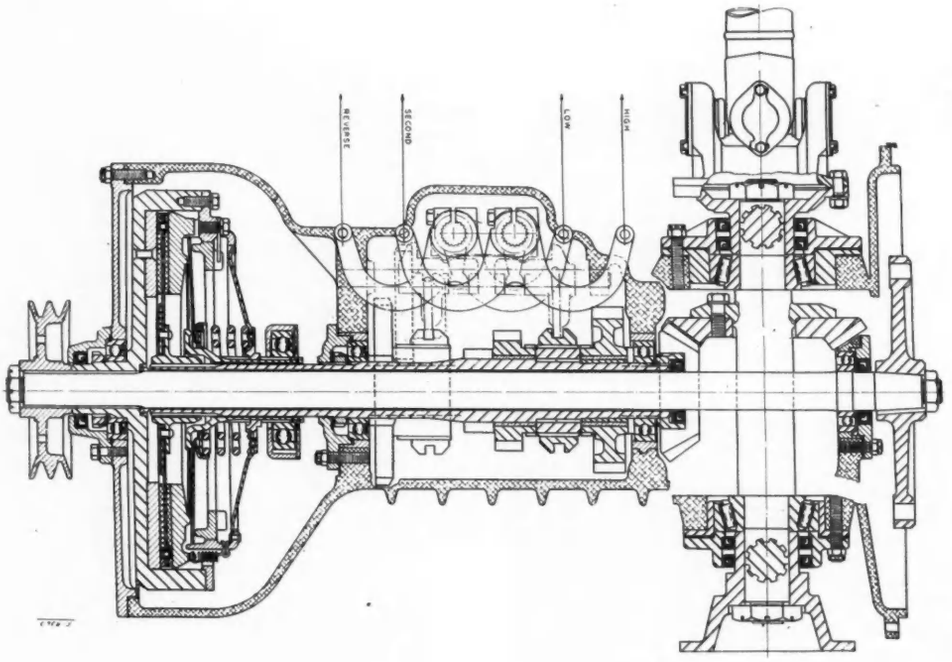
at the rear and the drive was electric. With electric drive, since there is no mechanical connection between the engine and the driving wheels, the powerplant can be placed in any convenient position. It seems, however, that the weight and cost of the electric drive limit its application to operation under conditions where its advantages, such as smooth, uninterrupted acceleration, are particularly appreciated. Thus the next step was to find a chassis layout that would permit of placing a single power unit in a position where it would not occupy space that might be utilized for passenger accommodation, and for which a mechanical drive to the rear axle could be arranged.

The drive does not involve any particular problem when the engine is slung under the frame amidships; the problem in that case consists of the development of a new engine type with a minimum encumbrance in the vertical direction and which shall have all of the advantages of smooth, balanced running and efficient lubrication of the modern vertical engine. But if a vertical engine is to be placed at the rear the problem of an efficient drive from the sprung powerplant to the unsprung rear axle arises, which involves difficulties, because the powerplant will be located either directly over the driving axle or only a short distance away.

This problem of mounting the powerplant transversely at the rear of the chassis and arranging a satisfactory drive from it to the rear driving axle has been worked out in various ways by different manufacturers. Before describing any of these layouts it may be well to point out that by thus stowing away the powerplant in space not available for passenger-accommodation in any case, it has been possible to provide seats for 20 passengers in a bus with an overall length of not much over 21 ft., and for 30 passengers with an overall length of between 25 and 26 ft. A comparison of wheelbases shows that for the same passenger capacity,



Vertical section through transmission and clutch



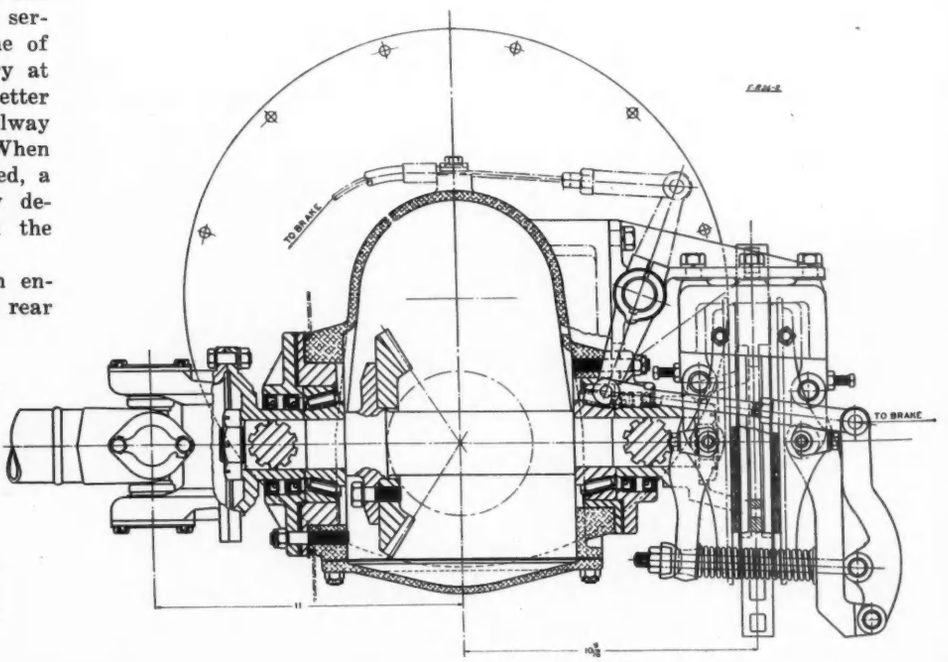
Horizontal section through transmission, clutch and transfer gear housing

the longest wheelbases are between 4 and 5 ft. longer than the shortest. This means not only much greater maneuverability for the smaller buses, but also reduced weight.

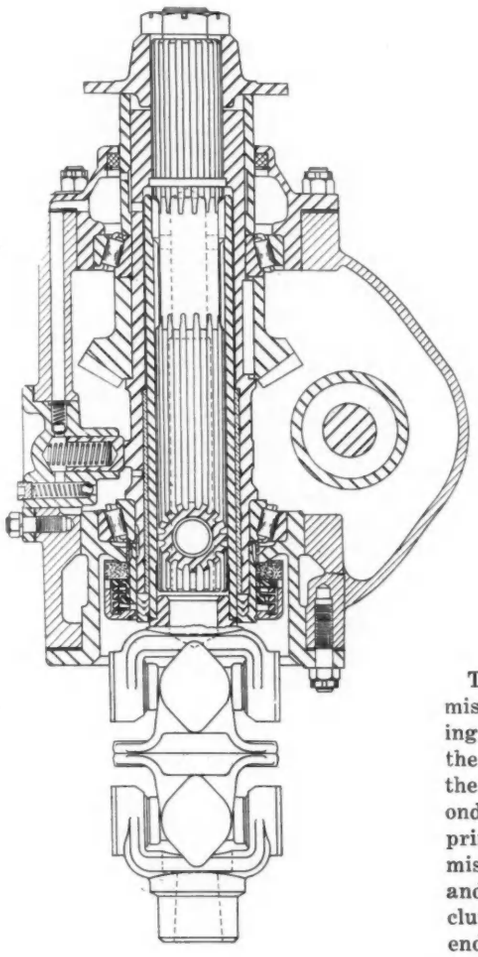
Another reason for the departure from the front-mounted engine is that it eliminates the propeller shaft underneath the floor of the bus and thus permits of placing the floor materially lower without providing a tunnel down the center of same to house the propeller shaft, which always detracts somewhat from the comfort of passengers. Low floor heights are desirable for several reasons. In the first place they facilitate ingress and egress of passengers. Then, bus speeds are constantly being increased and services are being run between some of the principal cities of the country at present with schedules that are better than those of regular-fare railway trains between the same cities. When such speeds have to be maintained, a low center of gravity is highly desirable because of its effect on the stability of the car on curves.

Among the newer models with engine mounted transversely at the rear is the Twin Coach Model 37-R. This is a 37-passenger bus having a wheelbase of 211 in., a front tread of 82¾ in. and a rear tread of 75¼ in. The reason for the smaller rear tread is, of course, the use of dual tires at the rear, the width to the outside of the tires being substantially the same at front and rear. With the bus loaded the height of the step from the ground is only 16 in. and the height of the floor, 28½ in. The bus weighs approximately 13,500 lb., making the weight with a full complement of passengers (at 150 lb. each), approximately 18,000 lb. The engine displacement is 529 cu. in., the standard gear reduction, 5.9, and the tire size, 9.00/20, which corresponds to an effective wheel diameter of 37 in. This gives a displacement factor of 22.6 cu. in. per ton-foot for the empty coach and 15.9 cu. in. per ton-foot for the coach with a full complement of passengers. At an engine speed of 2400 r.p.m. this coach has a road speed of 45 m.p.h.

The most interesting feature of the coach is the arrangement of the powerplant transversely at the rear and the drive from it to the rear axle. Fig. 1 is a side elevation of the rear part of the bus, which shows the engine mounted in an inclined position under the rear transverse seat, with the radiator core above it between the back of the rear seat and the rear panel of the bus body. The radiator core is inclined about 30 deg. to the horizontal, for the sake of space economy. There is an air duct extending centrally along the roof of the coach, with inlets from the



Vertical section through transfer-gear housing, showing location of hand brake



Showing arangement of drive on Model 23-R by which the relative motion between body and axle is compensated for by a sliding motion of a splined shaft

interior of the body for ventilation purposes, and an additional inlet from the outside toward the rear of the roof. Air is drawn through the radiator core and the engine space by fans at opposite ends of the powerplant, in circular openings in side panels, driven by V belts.

Instead of combining the clutch with the engine flywheel, it is located at the far end of the transmission, the clutch housing being cast integral with the transmission housing. To make this possible, the transmission is designed along rather unconventional lines. In the first place, the main shaft of the transmission is hollow, and a driving shaft extends through it which at one end is secured to the flywheel of the engine by a driving plate, while at the opposite end it has a small flywheel splined to it, in which the friction clutch is located. The driven member of the friction clutch is carried on splines on the hollow primary shaft of the transmission.

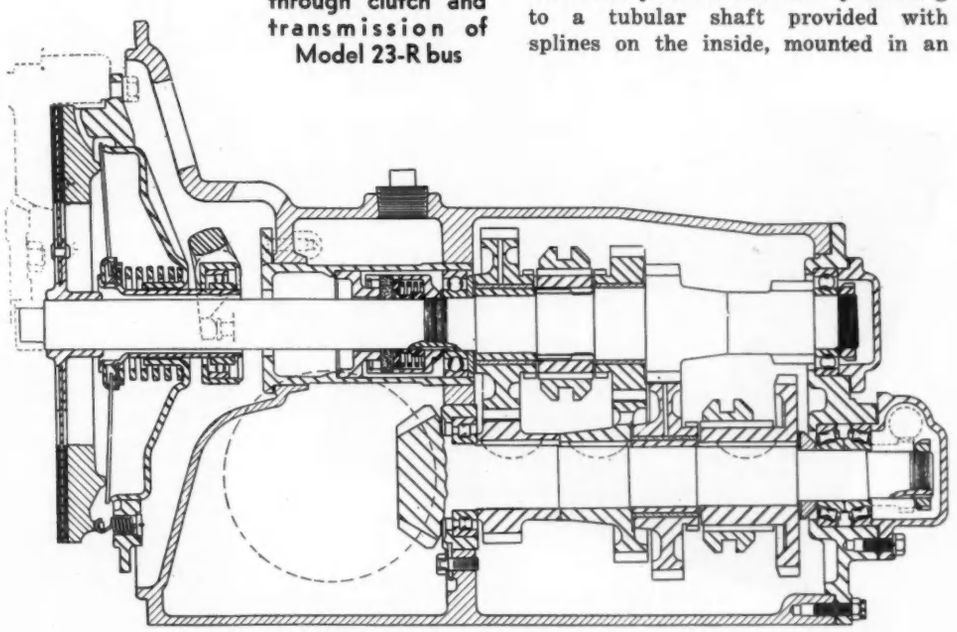
There is no direct drive in the transmission, all three forward speeds being through a pair of gears carried on the primary and secondary shafts of the transmission respectively. The secondary shaft is directly underneath the primary shaft. All gears in the transmission are of the constant-mesh type and are engaged by means of toothed clutches. The secondary shaft at its end near the engine carries a bevel gear which meshes with a somewhat larger bevel gear supported in bearings in the transmission housing. From the forward end of this shaft there is a driving connection through a short propeller shaft with universal joints to the rear driving axle, while the rearward extension of the shaft carries the disk of a disk-type emergency brake.

One problem that arises when the powerplant is located at the rear, a long distance from the driver's seat, is that of the operation of the clutch and transmission. In the Twin Coach 37-R all controls, including that of the emergency brake, are by cables. The clutches in the transmission are shifted by levers mounted on vertical splined shafts, which at their upper ends carry double-armed levers with strongly curved arms, from the ends of which control cables extend forward to the driver's seat, enclosed in tubes.

In a still more recent design of the Twin Coach Corporation, the Model 23-R, the floor is only 18 in. from the ground with a normal seated load, this low floor height being made possible by the complete elimination of mechanism below the floor. The rear-wheels are so far back that the rear-wheel housings do not interfere with the comfort of the passengers. All seats face forward, except those over the front wheel housings. The powerplant is mounted in a housing at the rear of the coach, directly over the rear axle. It is supported by frame cross members resting directly on the rear springs, which arrangement is said to make it possible to reduce the frame weight.

With the powerplant located over the rear axle, the problem of compensating for spring action had to be solved in a new way. The drive from the transmission to the rear axle is through a pair of needle-bearing universal joints, and spring action is compensated for by a splined sliding joint inside the transmission housing. By reference to the transverse section of the transmission housing it will be seen that the universal joint is secured by welding to a tubular shaft provided with splines on the inside, mounted in an

Horizontal section through clutch and transmission of Model 23-R bus



oilless bearing in another tubular shaft on which the driven bevel gear is keyed. The last-mentioned tubular shaft is carried on roller bearings in the transmission housing and at its upper end is provided with internal splines. The two tubular shafts are placed in driving connections by slipping an externally-splined solid shaft in from the top of the transmission. This shaft extends above the transmission housing and carries the disk of the disk-type emergency brake at its upper end.

The outer tubular shaft, which carries the bevel gear and the bearings, is sealed against oil leakage by a sylphon-type seal in conjunction with a carbon ring operating in contact with a polished cast iron surface.

Evidently, the torque reaction on the rear axle housing due to the drive and brake application is transmitted to the chassis frame through the universal joints and from the inner to the outer of the two tubular shafts inside the transmission housing. The side thrust due to this torque therefore does not come on the splined joint, but is taken up on the oilless bearing between the two tubular shafts. The splined joint takes only the torque of the propeller shaft, and since its dimensions are quite liberal, there is said to be no difficulty in keeping this joint oil-tight. Oil is fed to the top bearing of the bevel-gear hollow drive shaft by means of a centrifugal pump operated by a cam on the outside of the bevel-gear driveshaft, which provides constant circulation of oil through the entire driveshaft mechanism.

The rear axle is of conventional design, except that the axis of the driving pinion is vertical, the driving pinion being at the top. To assure adequate lubrication of the bearings on the shaft of the driving pinion, a special oil throw ring is provided. A bellows-type leather seal joins the rear axle and transmission and completely encloses the universal joints and the sliding tubular drive shaft where it enters the transmission.

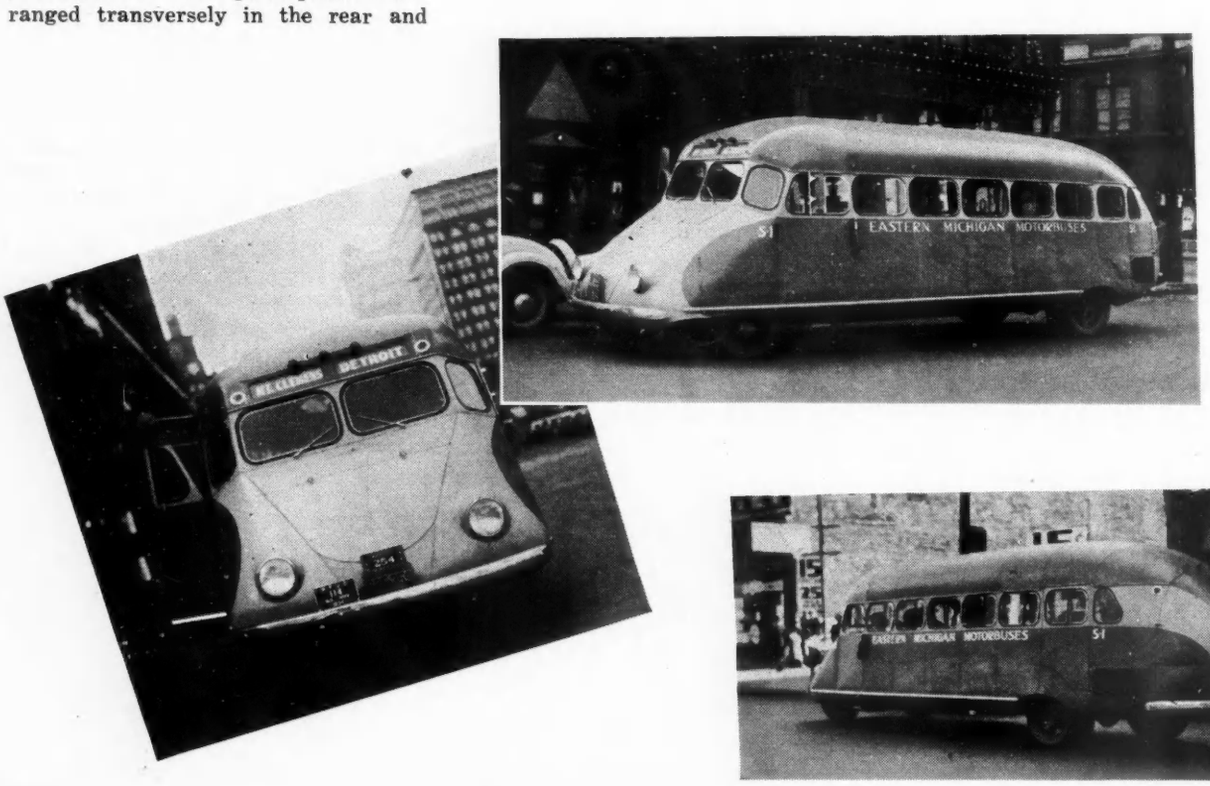
In this model the clutch is located between the engine and the transmission, as usual, the clutch housing being cast integral with the transmission housing, as shown by the sectional view reproduced herewith.

The Model 23-R has seating accommodations for 22 passengers. It has a wheelbase of 178 in., a front tread of 82⅛ in. and a rear tread of 73⅛ in. The weight is approximately 8400 lb., so that with driver and a full complement of passengers the gross load is about 11,850 lb. This coach is equipped with a 320-cu. in. engine, its standard gear ratio is 5 2/7, and the tire size 8.25/18, which gives an effective wheel diameter of 33.5 in. Hence the displacement factor of this coach is 21.7 cu. in. per ton-foot without load and 15.4 cu. in. per ton-foot with full complement of passengers. At an engine speed of 2400 r.p.m. this coach has a road speed of 45 m.p.h.

Stout Laboratories Follow "Scarab" Design in Bus Construction

THE accompanying photographs show a bus built by the Stout Engineering Laboratories of Dearborn, Mich. The structure is similar in general design to that employed in Mr. Stout's "Scarab" passenger car. The powerplant is arranged transversely in the rear and drives to the rear axle. The bus seats 24 passengers and is said to handle very nicely.

There is no internal bracing structure, except for two pillars at the front which seem to be intended mainly for passengers to hold onto when getting on and off.



JUST AMONG OURSELVES

Factory Enforcement of the Dealer Code

ALMOST from the inception of the dealer code, there has been a widespread feeling among the industry's retailers that the factories should coerce recalcitrant dealers into compliance, using the cancellation club if necessary. The feeling apparently has been almost equally widespread among dealers that the pursuit of this policy by the manufacturers involved no real legal obstacles.

This, of course, has never been the case, as GM President Sloan emphasizes in his recent letter to F. W. A. Vesper printed elsewhere in this issue in which he puts the corporation behind liquidated damages. In this communication, Mr. Sloan points to the dubious "legality of positive cooperation between the manufacturer and dealer with respect to the code."

While it may be comparatively safe for groups of relatively small business men to do things in violation of the anti-trust and other laws which their codes do not specifically authorize them to do, big corporations such as the automobile manufacturers cannot proceed on any such assumption, even if they had any desire to do anything other than to abide by the law.

* * *

Dealers Get More Gross Profit

WHETHER or not as a consequence of organized complaint from dealers that new car gross profits are inadequate, we are told that discounts on two eight-cylinder lines are being increased 2 per cent and that on another line a $3 charge made by the factory for certain services rendered, is being eliminated. Also we get a report, vague in its details, that a new form of contract for multiple-dealer points is under consideration. The way the story comes to us is that it is proposed to make multiple dealer cities closed territories —that is closed to dealers outside of these cities but open to dealers in them. How much chance there is of something of this sort being adopted we don't know, but if it is, it apparently will be designed to meet the complaints of city dealers that they are being undersold by lower-cost dealers located on the outskirts of the town.

Also there is talk of reorganizing dealer code administration on the basis of regional trading areas to supplant the present state advisory committee set-up.

* * *

Monopolies in Transportation

"OUR goal is a system which will make it possible to move goods from point of origin to point of destination at minimum cost—which may mean in one case that the goods will move all the way by rail, in another all the way by highway, and still another by water, rail and highway," Harold G. Moulton, president of the Brookings Institute, said last week at the U. S. Chamber meeting.

The problem can be handled effectively, he said, only "by a single transportation company, or companies, having freedom to use the various forms of transportation in whatever combination experience may prove to be the most economical . . ." Continuing, he admits that this would make the transportation business more completely a monopoly than ever before and that the problem of regulation would remain, although he believes in a simplified form.

If Mr. Moulton's proposal is sound in principle, there doesn't seem to be much reason why it shouldn't be applied to all business and thus at one stroke eliminate all the wastes to which our competitive economy is heir. Unfortunately for Mr. Moulton's theories, however, experience doesn't indicate that monopolies are motivated entirely by idealism even when government regulated. The monopolist may have the freedom to do the thing that serves the public best, but he doesn't always do it, particularly where it appears to serve his personal interest to do otherwise. It is because of this perfectly human inability of the monopolist to view his responsibilities with complete detachment that most Americans seem to think that competition with all of its wastes under most circumstances is more efficient than monopoly.

Presumably if Mr. Moulton's transportation theories were embraced, the nucleus around which the single transportation companies would be built would be existing railroads or combinations thereof. It is rather difficult to vision a monopolist, steeped in railroad tradition and with large investments in rail facilities, dividing traffic among rail, air, highway and water instrumentalities with complete detachment on the basis of which would serve the public best and cheapest. At least we have trouble picturing it.

The Editors

New Truck Registrations

	March 1935	February 1935	March 1934	Three Months 1935	Three Months 1934	Per Cent Change. 3 Mos., 1935 over 1934	Numerical Change. 3 Mos., 1935 over 1934	Per Cent of Total. 3 Months. 1935	Per Cent of Total. 3 Months. 1934
Ford	16,805	14,330	8,632	44,395	21,741	+104.5	22,654	39.97	26.75
Chevrolet	13,744	11,701	15,112	35,312	34,747	+1.9	565	31.79	42.76
Dodge	4,284	3,271	4,154	12,696	9,458	+34.3	3,238	11.43	11.64
International	3,673	3,174	2,841	10,360	7,275	+42.2	3,085	9.33	8.95
G. M. C.	850	570	717	2,278	1,725	+32.1	553	2.05	2.12
Diamond T	534	499	501	1,583	1,327	+19.6	256	1.43	1.63
Reo	389	292	461	1,061	1,089	—2.2	—28	.95	1.34
White	244	204	391	729	895	—18.5	—166	.66	1.10
Federal	132	113	170	397	411	—3.3	—14	.36	.51
Studebaker	135	107	126	369	333	+10.9	36	.33	.41
Mack	100	63	145	277	450	—38.5	—173	.25	.55
Willys-O.	138	69	2	216	9	+2300.0	207	.19	.01
Brockway	67	54	117	207	289	—28.4	—82	.19	.36
Autocar	56	41	64	168	201	—16.4	—33	.15	.25
Stewart	60	34	67	136	188	—27.6	—52	.12	.23
Austin	30	34	84	99	214	—53.7	—115	.09	.26
Terraplane	34	15	6	78	18	+334.0	60	.07	.02
Buick	22	12	16	62	30	+107.0	32	.06	.04
F. W. D.	15	31	6	60	30	+100.0	30	.05	.04
Indiana	14	13	61	54	198	—72.7	—144	.05	.24
Miscellaneous	185	170	211	530	635	—16.5	—105	.48	.79
Total	41,511	34,797	33,884	111,067	81,263	+36.7	29,804	100.00	100.00

U. S. New Car Registrations and Estimated Dollar Volumes by Retail Price Classes—First Three Months*

	UNITS					ESTIMATED DOLLAR VOLUME				
	1935	1934	Per Cent Change	Per Cent of Total 1935	Per Cent of Total 1934	1935	1934	Per Cent Change	Per Cent Total 1935	Per Cent Total 1934
Chevrolet, Ford & Plymouth	404,441	240,989	+67.7	71.15	73.18	$256,100,000	$146,800,000	+74.6	64.33	63.99
Others under $750	76,481	31,614	+141.6	13.45	9.60	54,900,000	22,300,000	+146.0	13.79	9.72
$751-$1,000	71,178	38,966	+82.8	12.52	11.83	60,300,000	32,100,000	+88.0	15.15	13.99
$1,001-$1,500	11,281	12,429	—9.2	1.98	3.77	13,900,000	14,900,000	—6.7	3.49	6.50
$1,501-$2,000	2,271	2,357	—3.5	.40	.72	3,800,000	4,100,000	—7.3	.95	1.79
$2,001-$3,000	1,822	2,198	—17.0	.32	.67	5,000,000	6,100,000	—18.0	1.26	2.66
$3,001 and over	1,000	770	+30.0	.18	.23	4,100,000	3,100,000	+32.2	1.03	1.35
Total	568,474	329,323	+72.6	100.00	100.00	$398,100,000	$229,400,000	+73.8	100.00	100.00
Miscellaneous	253	93	+172.0							
Total	568,727	329,416	+73.0							

*All calculations are based on list price F.O.B. factory of the five passenger, four-door sedan, in conjunction with actual new car registrations of each model. The total dollar volumes for the different models are then consolidated by price classes.

New Passenger Car Registrations

	March 1935	February 1935	March 1934	Three Months 1935	Three Months 1934	Per Cent Change 3 Mos., 1935 over 1934	Numerical Change 3 Mos., 1935 over 1934	Per Cent of Total Three Months. 1935	Per Cent of Total Three Months. 1934
Ford	94,986	64,957	46,200	206,249	100,838	+104.5	105,411	36.27	30.61
Chevrolet	55,733	29,536	50,796	111,818	82,870	+34.9	28,948	19.66	25.16
Plymouth	34,615	26,886	30,918	86,374	57,281	+50.8	29,093	15.19	17.39
Dodge	17,506	11,352	9,657	37,836	19,607	+93.0	18,229	6.65	5.95
Oldsmobile	14,755	9,220	4,602	28,428	6,908	+311.5	21,520	5.00	2.10
Pontiac	13,449	8,737	7,259	28,050	13,828	+102.8	14,222	4.93	4.20
Buick	5,393	3,651	4,962	13,284	10,905	+21.8	2,379	2.34	3.31
Terraplane	4,589	3,269	4,153	10,868	6,755	+60.9	4,113	1.91	2.05
Chrysler	4,283	2,646	1,879	8,853	2,584	+242.6	6,269	1.56	.78
Studebaker	3,304	2,123	4,164	8,104	8,634	—6.2	—530	1.42	2.62
DeSoto	2,583	1,458	866	5,302	1,650	+221.3	3,652	.93	.50
Hudson	1,844	1,264	2,223	4,425	3,112	+42.2	1,313	.78	.94
Lafayette	1,216	810	167	2,877	198	+1353.0	2,679	.51	.06
Nash	1,212	803	1,418	2,848	3,832	—25.7	—984	.50	1.16
Graham	1,323	900	1,173	2,819	2,265	+24.4	554	.50	.69
Willys	974	637	325	1,878	1,186	+58.3	692	.33	.36
Hupmobile	795	440	317	1,787	865	+106.6	922	.31	.26
Packard	928	348	421	1,707	1,062	+60.7	645	.30	.32
Auburn	482	423	186	1,391	852	+63.2	539	.24	.26
LaSalle	500	404	153	1,273	254	+401.2	1,019	.22	.08
Cadillac	433	316	516	1,046	1,081	—3.2	—35	.18	.33
Reo	317	194	222	739	652	+13.3	87	.13	.20
Lincoln	142	113	178	370	427	—13.4	—57	.07	.13
Pierce-Arrow	59	39	144	148	341	—56.6	—193	.03	.10
Miscellaneous	56	89	388	253	1,429	—82.3	—1,176	.04	.44
Total	261,477	170.615	173,287	568,727	329,416	+72.6	239,311	100.00	100.00
Chrysler Corp.	58,987	42,342	43,320	138,365	81,122	+70.6	57,243	24.33	24.62
Ford & Lincoln	95,128	65,070	46,378	206,619	101,265	+104.0	105,354	36.34	30.74
General Motors	90,263	51,864	68,288	183,899	115,846	+58.7	68,053	32.33	35.18
All others	17,099	11,339	15,301	39,844	31,183	+27.7	8,661	7.00	9.46

U. S. New Car Registrations and Estimated Dollar Volumes by Retail Price Classes—March*

	UNITS					ESTIMATED DOLLAR VOLUME				
	1935	1934	Per Cent Change	Per Cent of Total 1935	Per Cent of Total 1934	1935	1934	Per Cent Change	Per Cent Total 1935	Per Cent Total 1934
Chevrolet, Ford & Plymouth	185,334	127,914	+45.0	70.90	73.83	$117,700,000	$79,300,000	+47.8	64.46	65.70
Others under $750	35,408	16,722	+112.0	13.54	9.65	25,400,000	11,900,000	+113.0	13.91	9.86
$751-$1,000	33,776	20,892	+61.6	12.92	12.06	28,600,000	17,300,000	+65.4	15.66	14.33
$1,001-$1,500	5,044	5,612	—10.2	1.93	3.24	6,100,000	6,800,000	—10.2	3.34	5.63
$1,501-$2,000	755	815	—7.3	.29	.47	1,300,000	1,400,000	—7.1	.71	1.16
$2,001-$3,000	737	989	—25.4	.28	.57	2,000,000	2,700,000	—25.8	1.10	2.24
$3,001 and over	367	320	+14.8	.14	.18	1,500,000	1,300,000	+15.3	.82	1.08
Total	261,421	173,264	+51.0	100.00	100.00	$182,600,000	$120,700,000	+51.3	100.00	100.00
Miscellaneous	56	23	+143.5							
Total	261,477	173,287	+51.1							

*All calculations are based on list price F.O.B. factory of the five passenger, four-door sedan, in conjunction with actual new car registrations of each model. The total dollar volumes for the different models are then consolidated by price classes.

AUTOMOTIVE ABSTRACTS

Tin Compounds as Anti-Sludgers for Lubricating Oil

LUBRICATING oils easily oxidize in service when subjected to temperatures exceeding 300 deg. F. They become acid and sticky, and they lose their color. The products which are formed under these conditions become catalysers for further oxidation.

Numerous organic anti-oxidizers are known, which when added to the oil in small proportion prevent this change, but they cannot be used effectively in case the oil is subjected to high temperatures, because at these temperatures they too are subjected to chemical change and decomposition. This, however, does not hold for a large number of inorganic compounds such as tetra-ethyl lead.

Recent research undertaken by the International Tin Research and Development Council has shown that tin compounds possess this property to a high degree. In a brochure published by that organization some time ago, M. Mardles gives the results of tests made with some of these compounds at temperatures up to 475 deg. F. The results varied widely with the nature of the lubricant, the tin compound, the concentration and certain experimental conditions.

In a general way the best results are obtained with the fatty-acid compounds of tin, and particularly the oleates; next come the organo-metallic compounds such as tin tetraphenyl or naphthyl. If from 0.2 to 1 per cent of either of these compounds is added to the oil the change is greatly reduced. For exceptionally high temperatures suspensions of tin or tin dioxide in powdered form may be used.

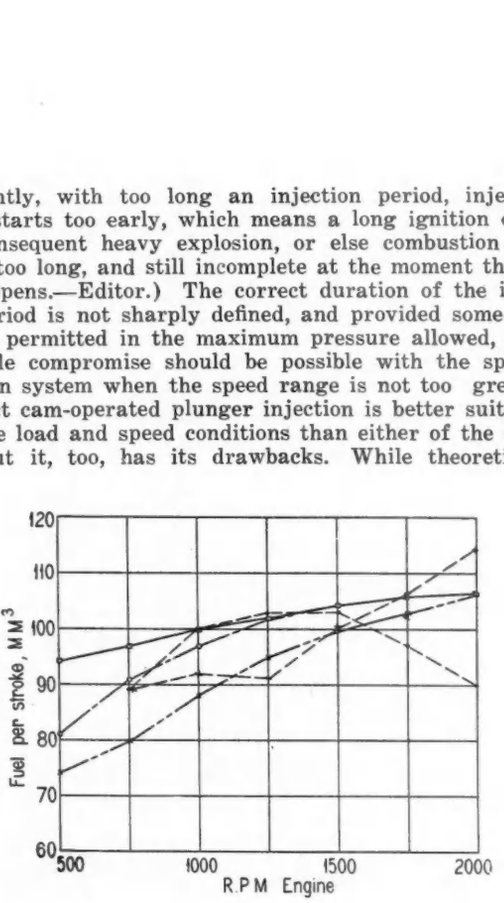
The mechanism of the action of the tin is not fully understood. It seems that it acts by destroying or reducing the catalysing agents referred to at the beginning of this abstract.—*Le Genie Civil*, Feb. 2.

Fuel Injection

FUEL injection systems may be divided into three classes, viz., the constant-pressure (or common-rail) system, the spring-injection system, and the direct cam-operated plunger system. The first two are unsuitable for vehicle engines in which both speed and load vary widely and rapidly, unless some fundamental change is made in their make-up. With the first system the quantity of fuel injected varies directly with time, and if the valve is held open for a certain number of crank degrees, the amount of fuel injected per cycle will vary inversely as the speed of the engine. To make injection independent of engine speed would require changing either the injection pressure or the nozzle orifice with engine speed, which involves great difficulties.

With the spring-injection system the period of injection is constant and therefore extends over a greater crank angle at high than at low speeds. In one case the period increased from 14 deg. at 500 to 40 deg. at 2000 r.p.m. The injection period was about right for speeds of 1250-1500 r.p.m., while at higher speeds either the maximum pressure became excessive or the combustion became very irregular. (Evidently, with too long an injection period, injection either starts too early, which means a long ignition delay and consequent heavy explosion, or else combustion continued too long, and still incomplete at the moment the exhaust opens.—Editor.) The correct duration of the injection period is not sharply defined, and provided some latitude is permitted in the maximum pressure allowed, some workable compromise should be possible with the spring-injection system when the speed range is not too great.

Direct cam-operated plunger injection is better suited to variable load and speed conditions than either of the other two, but it, too, has its drawbacks. While theoretically



the pump delivery is independent of engine speed, no actual pump has such a characteristic. The delivery preferably should vary the same as the maximum fuel the engine will burn per cycle without smoke at the different speeds, which is usually a maximum at an intermediate speed and drops off somewhat toward both ends of the speed range. Pump delivery per stroke in general increases with speed, but the actual dependence of delivery on speed varies with the design of the pump. Fig. 1 shows speed-delivery curves for four different injection pumps for an injection pressure of 95 atmospheres. There is a tendency with most pumps to deliver too much fuel at high speeds, and if the delivery is adjusted to give clean combustion at high speed, then the torque at low speed is not the maximum obtainable. When the precise nature of the various factors affecting pump delivery is known it should be possible to make the pump give any desired speed-delivery curve by balancing the various factors against each other.

The speed-delivery characteristic also depends upon the type of nozzle employed and is quite different for a pintle-type nozzle, with which injection is valve-controlled, than with an ordinary nozzle, in which it is orifice-controlled. This is due to the fact that with the pintle-type nozzle the effective area of the minimum fuel passage area increases with the speed. The suction side of the pump also has an influence on the speed-delivery characteristic, particularly when the pump fills and spills through the same port, and the effect is greater in single than in multiple unit pumps. This is due to the fact that spilling begins when the fuel is

under substantially maximum pressure, and the backward wave started through the pump inlet pipe may prevent the pump barrel from properly filling for the next cycle. In multi-unit pumps this trouble is usually avoided by providing a chamber within the body of the pump through which all elements are connected to a common supply pipe.

Supply pipe and filter also have an influence on the delivery and it was noticed in experimental work that by switching from the main supply tank to a measuring tank, whereby the head on the fuel was reduced about 30 in., the dynamometer beam load decreased the equivalent of 1 lb. per sq. in. The supply pipe should be the maximum size which can be conveniently accommodated and should be as short as possible.

An injection pump used in connection with a valve-closed nozzle can be operated without a delivery valve, the nozzle valve then serving as a delivery valve. However, if the nozzle valve does not seat properly for any reason, gas blows backward through it when no fuel is being injected, and this interferes with the operation of the pump. If there is a delivery valve in the pump, no gas can pass the nozzle valve even though the latter does not seat properly, because the line is filled with fuel which cannot pass the delivery valve.

Faulty seating of the nozzle valve also leads to another kind of trouble. If the pressure in the line is not relieved between injections, the high pressure will cause fuel to seep past the valve and to wet the face of the nozzle around the orifice, causing it to coke up quickly. Such a nozzle may work satisfactorily for a long time if the line pressure is relieved. Another reason making pressure relief in the fuel line highly desirable is that without it no sharp cut-off can be obtained; on the contrary, the delivery drops off gradually, which results in imperfect atomization (increase in the mean diameter of the droplets) and consequently imperfect combustion.

It was found that with the delivery valve removed the delivery characteristics of the system (8 mm. pump plunger, 95 ats. injection pressure, pintle-type nozzle) were very materially changed. At 1000 r.p.m., to obtain a just visible exhaust it was necessary to move the control rod 11 mm. from the stop, without the delivery valve, while with the delivery valve it had to be moved 15.5 mm. It was also found that the speed-delivery characteristics with and without delivery valve in the pump differed greatly. Thus with the fuel control set as above, the delivery without delivery valve increased from 103 cu. mm. at 1000 r.p.m. to 124 cu. mm. at 2000 r.p.m., while with delivery valve it decreased from 92 cu. mm. at 1000 to 97 cu. mm. at 2000 r.p.m.

The pressure-relieving effect of the Van Amstell delivery valve varies with the speed. By careful design, a valve which has no "drawback" action at all can be made to relieve the pressure completely over a wide range of speeds. This property appears to belong to valves of the shuttle type and "knock-off" spill valves, ball valves apparently having a marked tendency to keep the line under pressure.—C. B. Dicksee in *The Automobile Engineer* for March.

More Efficient Production and Distribution the Key to Sustained Prosperity in America

A resolution adopted unanimously by the annual meeting of the Associated Business Papers, Inc.

AS close and continuous observers of American industry and trade, the business press is convinced that the well-being and prosperity of our people must depend, in the long run, upon the maintenance of constantly increasing efficiency of production and distribution. Only in this way can high standards of living for the American consumer be maintained.

To realize this objective it is essential that the development of new methods and processes for the manufacture of goods required by the consumer, together with the promotion of efficiency in distribution and merchandising, be stimulated in every legitimate way. The chief motivation of this development always has been, and we believe must continue to be, the incentive offered by the profit system. So long as the competent and the enterprising can anticipate rewards proportionate to the skill and energy expended, this progress, benefiting industry and the public alike, will continue.

Therefore, any tendency on the part of government to interfere with this vital process we believe is against public interest. Under the stress of emergency many measures have been adopted for the control of industry and trade which seem to us to be inconsistent with the tested principles which have been responsible for national progress and the well-being of the individual citizen in every walk of life. Whatever merit these measures may have, as expedients designed solely to meet the exigencies of a national crisis, it is manifest that they cannot be continued indefinitely without crippling the industrial structure, dislocating and unbalancing the national economy, and reducing the opportunities of the individual business man, worker and consumer.

We urge, therefore, that government discontinue, at the earliest possible moment, all those temporary measures which have been found to interfere with the normal and healthy processes of American business, or which are not in keeping with traditional American policies of individual progress through competitive merit, or of progressively higher standards of living for the people as a whole through continued increases in productive efficiency.

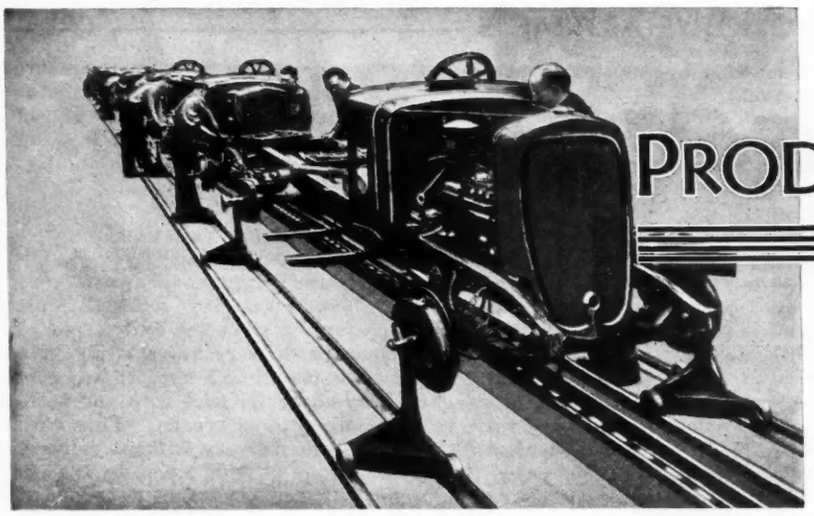
At the same time we recognize the right and duty of government to adopt those measures which are necessary for the protection of legitimate business and all other citizens from the exploitation of predatory interests, whether these be in the ranks of industry, finance or labor. We recognize the necessity of protecting the public from natural monopoly or monopolistic practices affecting production, rates, prices and wages. Industries which are naturally competitive should not be allowed to engage in monopoly practices without government regulation. We therefore urge that, to whatever extent industry opposes government regimentation, it shall as a matter of consistency and sound economics accept the principle and carry out the practice of free competition in the public interest.

We are opposed to government operation of business enterprises and competition with its own citizens.

We are opposed to government ownership and operation of railways.

We believe the restriction of free enterprise and competition through a system of government licensing of processors, as proposed in amendments to the Agricultural Adjustment Act, to be inconsistent with the interests of agriculture, business and the public.

We urge the elimination at the earliest possible moment of all artificial brakes upon freedom of individual initiative and enterprise, because we believe that through them alone employment can be expanded, and normal incentives for business development and capital investment provided.



PRODUCTION LINES

Valve Form

Like many other things that have been made the same way for a long time, valves have enjoyed the same form from time immemorial. Comes now an expert who wonders whether or not something could be done to the valve head. What improvement would there be, for example, if the beveled edge were rounded off rather than sharp as at present. In other words, is there any virtue in streamlining the course of the flowing gas stream. What say you?

More to the Foot

Visited the Flatrock lamp works —one of Ford's decentralized projects out in the country. It's truly the most remarkable manufacturing plant we have ever seen. Suffice it to say that it probably turns out more product per square foot of area than any other plant in the industry. One short section, less than a hundred feet in length, serves as the assembly line for Ford's entire output of head lamps. Compactness of the materials handling system is truly amazing. Here you will see row upon row of conveyor lines, ten rows in one aisle alone, moving along with unerring precision.

Prevents Flaws

The Dupont Magazine for April has an interesting article on a new metallurgical device for producing better brass castings. It deals with sodium-zinc alloy additions in small percentages of the charge. This alloy is said to eliminate casting flaws of the nature of blow holes, spills, etc., due to oxide and gas occlusions. We recommend a reading of this report.

Rust Veto

We told you early this year about several new rust-proofing coatings developed by American Chemical Paint. That these processes have more than usual merit is vouched for by the fact that two of these methods have been adopted by important plants in the industry. Electro Granodizing has worked out very successfully in the manufacture of lamp bodies produced in tremendous volume. In the other plant, Cromodine paint adherent coating is sprayed on fenders. Watch these developments closely.

Induced Heat

Heating by induced electric currents looms as one of the most important developments in recent years. For low temperature heating the equipment is relatively simple since in many cases 60 cycle current does the trick. The most impressive application to date is dehydrating the rust-proofed coating on autobodies in which the entire body is subjected to the treatment.

Welding Flashes

Do you get "Flashes," a new house organ issued monthly by Thompson-Gibb? It's a folder packed with information concerning the latest developments in the welding field. That puts it right down your alley. If you want it regularly, let us put you on the mailing list.

Another Change

Olds hood louver is now fabricated of stainless steel strips, rolled, bent, welded into light assembly. We'll tell you how it's done pretty soon.

Back to Zinc

Remember back around Show time we mentioned that the hardware on Ford deLuxe cars was of aluminum die castings finished by anodizing. This was changed some time recently. Current production is back to zinc die castings—not because aluminum is not satisfactory—but because of a novel finish now available. The zinc die castings on deLuxe jobs are first rust-proofed by a special process that we can tell you about, confidentially. Then the pieces are coated by a process of applying a heavy coating of nitrocellulose material. This finish promises to last a lifetime.

Coming Problem

What's worrying the car factories right now is how they will handle the bigger streamlined bodies for 1936 in the present ovens. Where the bodies have been pushed through sidewise there is no longer sufficient clearance. Yet there is no room for longer baking ovens to accommodate bodies sent through lengthwise.

K-Monel

The new monel-aluminum alloy, K-Monel, which we mentioned some time ago is described rather completely in an article published in the current issue of Inco. We can get you a copy.

New Contact

Good news for those who are interested in contact points for horns and generator controls. Some time soon you may expect to hear about a silver-alloy contact with desirable characteristics and best of all at a price.

—J. G.

MANUFACTURING MANAGEMENT METALLURGY

Bendix Develops Rotary Vacuum Pump for Use with Power Brakes

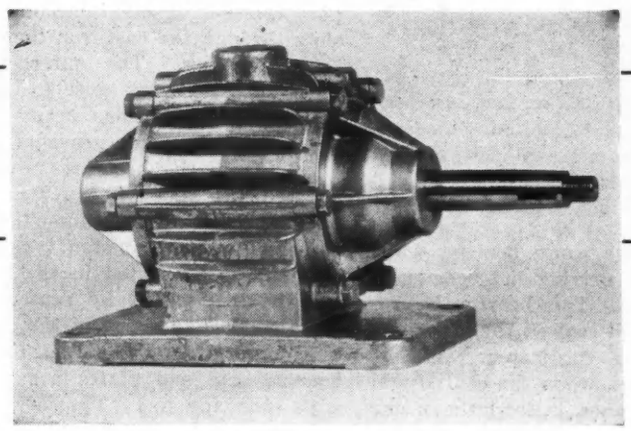


Fig. 1—Bendix vacuum pump with a displacement of 7 cu. ft. per min.

FOR use in connection with vacuum brakes on trucks or buses equipped with Diesel engines, and on vehicles equipped with gasoline engines when operated in mountainous territory, the Bendix Products Corporation, South Bend, Ind., has developed a special vacuum pump of the rotary type which is illustrated herewith. It is believed that this pump will fill a need also in connection with vacuum controls in the aviation, railroad, marine and industrial fields.

The pump was designed to fit existing standard air-compressor mountings and may be driven by V belt, silent chain, or direct through a flexible coupling. Its weight is only 8 lb. but it is designed for continuous operation at 3000 r.p.m. and at this speed delivers 7 cu. ft. of free air per minute. Its normal balancing point is 28.5 in. of vacuum, which is, of course, considerably higher than the vacuum obtainable from the inlet manifold. With the pump as a source of vacuum, the power cylinders used may be 30 per cent smaller in size, so that the weight and cost of the complete installation are not materially increased.

Referring to the sectional view shown in Fig. 2, the pump consists essentially of a rotor with three sliding vanes operating in a housing eccentric with respect to the rotor. As each vane passes the suction port, the volume between it and the following vane increases continuously until it reaches a maximum value, at which point the following vane closes the suction port. During the remainder of the revolution the volume between the two vanes decreases, and during this period it is in communication with the discharge port, through which all of the air previously drawn in through the suction port is ejected. There are three such cycles per revolution.

Lubrication of the pump is effected from the pressure-lubrication system of the engine. Oil under pressure is admitted to the base, whence it flows through passages in the housing and the rear end plate to the rear bearing. The pump shaft is drilled and contains three equally-spaced metering holes which register with the port in the bearing, so that a limited supply of oil is directed to the bottom of each vane slot, through short, direct passages. The combination of oil pressure and centrifugal force is said to effectively seal all clearances, and to maintain an excess of oil at all bearing surfaces under all conditions. Excess oil is discharged into the engine crankcase through the discharge port in the pump.

The housing and end plates are die castings of aluminum alloy, a cast-iron liner being cast into the housing. The rotor is a casting of an aluminum-alloy of low heat expansion and has the shaft cast in. The vanes are of a wear-resistant aluminum alloy, this

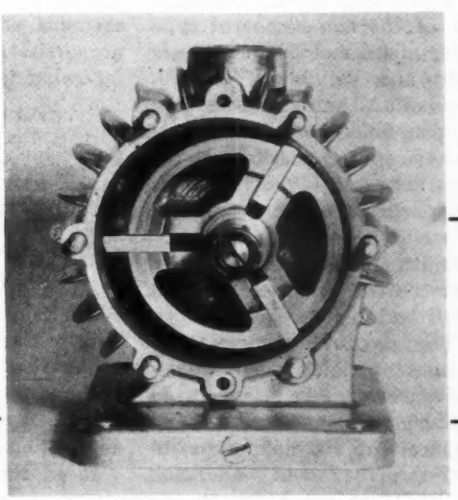


Fig. 2 — Interior of Bendix vacuum pump

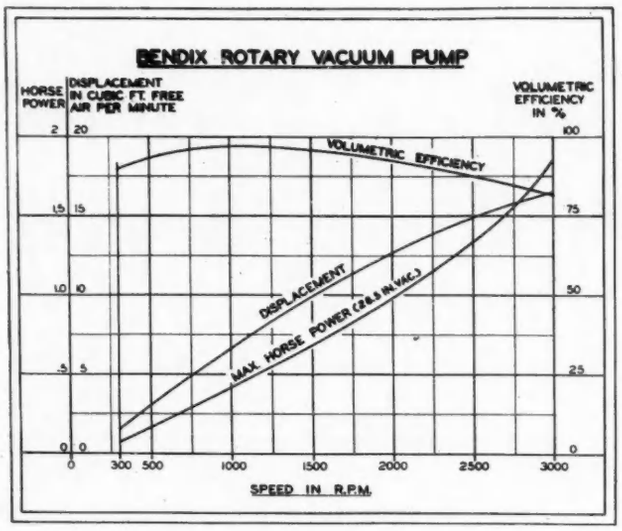


Fig. 3 — Characteristic curves of vacuum pump

light alloy being chosen to reduce the centrifugal force and consequent wear at high speeds. This also increases the operating efficiency. It is stated that after 1500 hours continuous operation at 3400 r.p.m. under 24 in. of vacuum, the vanes show practically no wear.

The rear end of the rotor shaft is carried in a large bronze bearing, while the forward or driving-end bearing is of the ball type. This bearing is provided with an oil seal on the outer end and is pressure lubricated. At low operating speeds, when the centrifugal force on the vanes is low, the latter are held firmly against the housing by the oil pressure on them.

Oil passages are made of liberal size, to prevent clogging. The discharge port consists of eight circumferential slots through the cast-iron liner in the pump housing. The outer ends of these slots are very close to the point of minimum clearance between housing and rotor, which prevents passage of air from the high-pressure to the low-pressure side. This feature eliminates the "clearance volume" which is a disadvantage of piston type pumps.

The heat generated in the pump is rapidly disposed of by reason of the high heat conductivity of the construction material and the fact that both housing and end plates are provided with radiating fins. Typical performance curves of the pump are shown in Fig. 3.

Increased Strength and Corrosion Resistance Feature New Alloy Steels

A NEW alloy steel, claimed to be stronger and more corrosion-resistant than common steels, has been developed by the Republic Steel Company and will be marketed by it under the name of Republic Double-Strength steel. It is of the same general type as the copper-nickel-molybdenum steels developed by the Republic Steel Co. and shows similar characteristics. In the automotive field the new steel is believed to have special possibilities for use in coal trucks and similar vehicles carrying corrosion-promoting products.

For a rolled product, Republic Double-Strength steel has an unusually large copper content, and metallurgists probably will watch its behavior with interest. The physical properties of the two grades of which the compositions are given below can be increased 15,000 to 20,000 lb. per sq. in. by tempering sheets at 900 deg. Fahr. to 1000 deg. Fahr. for about one hour. The commercial value of these higher properties is said to be somewhat questionable at present, but the engineering profession may find ways and means to turn them to account.

The steel is made in two grades, the chemical compositions and physical properties of which are given in the following tables:

Grade 1	Grade 1-A
Carbon, 0.12 max.	Carbon, 0.30 max.
Manganese, 0.50-1.00	Manganese, 0.5-1.00
Copper, 0.050-1.50	Copper, 0.50-1.50
Nickel, 0.40-0.80	Nickel, 0.40-0.80
Molybdenum, 0.20 max.	Molybdenum, 0.20 max.

Physical Properties of Normalized Sheet, Strip and Plates

Yield Point, 60,000 lb. per sq. in.
Tensile Strength, 75,000 lb. per sq. in.
Elongation in 2 in., 25 per cent min.
Yield Point, 70,000 lb. per sq. in.
Tensile Strength, 90,000 lb. per sq. in.
Elongation in 2 in., 18 per cent.

It is claimed that notwithstanding the combination of high strength, corrosion resistance and ductility, this steel can be fabricated without difficulty. In order to be able to fabricate satisfactorily sections so large that they cannot be annealed or heat-treated after welding, it is necessary to use a high-strength material which does not air-harden, and Republic Double-Strength steel has little tendency to air-harden. This makes it well adapted to welding by the arc method, and it can also be satisfactorily spot-resistance-welded. "With the proper welding wire and procedure," the manufacturers state, "tough, strong welds are readily produced. Material under 16 gage should be spot-welded, as it is too light to weld satisfactorily by other processes. Arc welding can be accomplished satisfactorily on material as light as 16 gage. No difficulty is encountered in welding the heavier gages."

American Cars Lead in Acceleration and Speed; British in Fuel Economy

AMERICAN cars sold in England compare well with British cars of similar size with respect to maximum speed and acceleration, but not so well with respect to fuel economy, to judge from figures presented in a paper contributed to the Institution of Automobile Engineers by Maurice Platt, technical editor of *The Motor*. The figures given are based on road tests made by Mr. Platt and his colleagues, and for the purpose of comparison the cars tested were divided into classes according to the cylinder number and price. Medium-priced six and eight-cylinder American cars are grouped in one class, which comprises cars listing on the English market at between £320 and £565. These cars can be compared with a class of British six-cylinder cars listing at between £300 and £500, and with another class of more powerful and higher-priced British six and eight-cylinder cars listing at between £550 and £1400.

As regards maximum speed, the American cars excel both of the British classes, the maximum speeds of the former ranging between 74 and 93 m.p.h., as compared with 61-74 m.p.h. for the medium-sized British sixes and 63-78 m.p.h. for more powerful British sixes and eights. The American cars are slightly in the advantage also as regards maximum speed in third or other intermediate gear.

The time required for accelerating from a standstill up to 50 m.p.h. through the gears ranged from 14 to 17 sec. for the American cars, from 18 to 23 for the smaller British cars and from 20 to 28 sec. for the larger ones. Thus the smaller British cars actually have greater accelerating powers than the larger ones, a situation which is duplicated in this country at the present. Acceleration from 10 to 30 m.p.h. in top gear required 7 to 10 sec. in the case of the American cars, 9 to 12 sec. in the case of the smaller and 8.5 to 12 in the case of the larger British cars, while acceleration from 30 to 50 m.p.h. in top gear took 7.5 to 11.5 sec. in the case of the American cars and 11 to 14.5 sec. and 10 to 20 sec. in the cases of the two classes of British cars. Thus the American cars are in advantage on every count from the standpoints of speed and acceleration.

Comparisons of economy are made on two bases, viz., miles per gallon (the Imperial gallon, of course), and ton-miles per gallon, the ton in this case being the long ton of 2240 lb.

While the American cars did only 13 to 18 m.p.g., the British smaller sixes did 18 to 20, and the more powerful sixes and eights, 15 to 17.5, which latter figure, of course, are not much better than those for the American cars. It is on the basis of ton-miles per gallon that the British cars show up much more favorably, most of the cars in the second British class evidently being quite heavy vehicles. While the American cars achieved from 22 to 27 ton-miles per gallon, the smaller British cars did 30 to 32 and the British larger cars, 31 to 36 ton-miles per gallon.

The disadvantage of the American cars from the economy standpoint is, of course, directly related to their advantage from the speed and acceleration standpoints. You cannot well have both high acceleration in high gear and high fuel economy too.

We cannot be sure, of course, whether this completely explains the difference between the specific consumption figures. Apparently, most of the American cars included in the comparison were low-priced models designed primarily to meet conditions in the home market. It is well known that the American buyer does not attach as much importance to fuel economy as the foreigner, and it is quite possible that in the design of these cars some available means for reducing fuel consumption were omitted to keep down the manufacturing costs. It may be pointed out in this connection that the average price of the more powerful class of British cars was more than twice that of the American cars, and a somewhat higher degree of refinement would naturally be expected in the former.

"Macoid" Process Finishes Parts With Cellulose Nitrate Coating

WHAT promises to be one of the most significant developments in surface finish for automotive products of every description has been recently reduced to commercial practice by the newly formed Detroit Macoid Corp., Detroit, Mich. Arthur Gardner, who was instrumental in developing this corporation, is president of this organization.

The "Macoid" process, fully protected by basic patents, is a method of producing a cellulose nitrate coating on any type of material—metal, wood, rubber, glass, etc. "Macoid," which is the registered trade name of this coating, may be pigmented to develop an endless variety of striking decorative effects possessing great mechanical strength, resistance to abrasion and wear, and resistance to weathering and chemical attack. The coating is usually applied in thicknesses ranging from .005 to 0.020 in.

Although production was begun only about three months ago, the finish has been adopted by one of the large car manufacturers for interior hardware on deluxe models. On this application the hardware is a zinc base die casting treated by dipping in Granodine, an ACP process for additional adherence as demanded by the car maker.

Some idea of the properties of this coating may be gained from the tests to which it was subjected before its adoption. It passed successfully the salt spray tests; tests for wear by rubbing and aging; a cycle of temperature effects starting first with exposure in a bake for one hour at 150 deg. F., and then directly into a refrigeration chamber held at minus 15 deg. F.

The finish for this hardware is particularly attractive, having an irridescent sheen produced with aluminum powder mixed in the pigment.

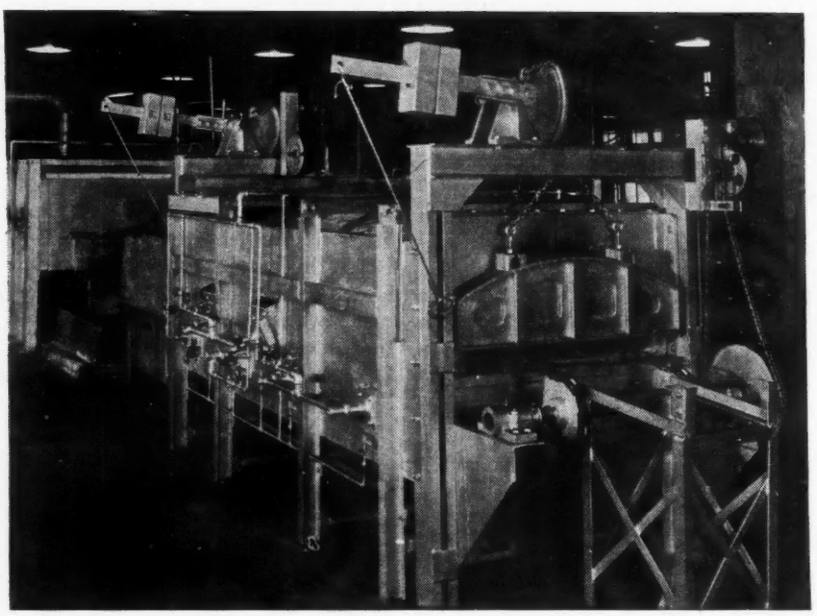
Among the more common applications that lend themselves quite economically

to this process are: body hardware, steering wheels, gear shift balls, instrument boards and fittings, aircraft fittings, wooden aircraft propellers, exposed car and bus accessories.

The basis of the "Macoid" process is the application of a special viscous coating of cellulose nitrate prepared on the premises, premixed with the desired pigment. Parts are dipped into a tank containing the prepared material, under controlled conditions of temperature and humidity in the dipping department. The thickness of the coating is determined by the viscosity of the mixture and the speed at which the object is passed through the solution, both controllable. After dipping, the parts are cured and ready for shipment by aging in a refrigeration chamber at extremely low temperatures.

It is claimed that ordinarily the parts to be coated will not require special preparation or surface treatment, since the coating is flexible, and has the unique property of shrinking tenaciously about the surface to which it has been applied.

Hardening and Drawing Unit For Packard 120 Line



ONE of the interesting spots in the production line recently developed for the Packard 120 car is the hardening and drawing unit for the clean-hardening of axle shafts which was installed by the Surface Combustion Corp., Toledo, Ohio.

Shafts are loaded at the charge end of the furnace onto a twin type alloy screw conveyor by means of a hand-operated feeder. As the shafts enter the muffle they fall between a pair of correlated flights of each screw and onto four alloy supporting rails, located alongside the screws, one on either side of the screws. Rotation of the screws advances the shafts through the muffle. This conveyor is carried through a gaseous atmosphere toward the discharge end of the furnace, where the work falls a short distance onto a mechanically operated lowerator. The lowerator rapidly carries the shafts into the quenching medium where they are permitted to fall from onto the quench tank conveyor, and thence to the draw furnace.

Capacity 248 pounds of steel per hour, or 20 shafts—from cold to 1600° F.

A rich gaseous atmosphere of Surface Combustion DX gas prepared in one of the standard DX gas preparation machines is maintained to prevent scale formation on the axles.

The muffles and shafts are heated by standard low pressure type velocity burners located along the side walls of the furnace and are arranged to fire both above and below the muffle. Forty-one minutes are required for heating work, which is allowed to soak ten minutes after being heated to 1400° F.

The draw furnace is equipped with a continuous chain type conveyor. Both ends of the conveyor are outside the furnace chamber, the return side traveling beneath and outside the furnace.

The draw furnace is heated by SC standard low pressure velocity burners located in the side walls of the furnace and arranged to fire into individual ducts located beneath the conveyor in the furnace chamber. A portion of the burned gases is recirculated within the chamber, thereby promoting uniform heat distribution in any cross section of the furnace.

The heating cycle is 50 minutes heating to 500° F. and soaking 40 minutes.

Both of these units are equipped with automatic temperature controls.

Governors for Diesels

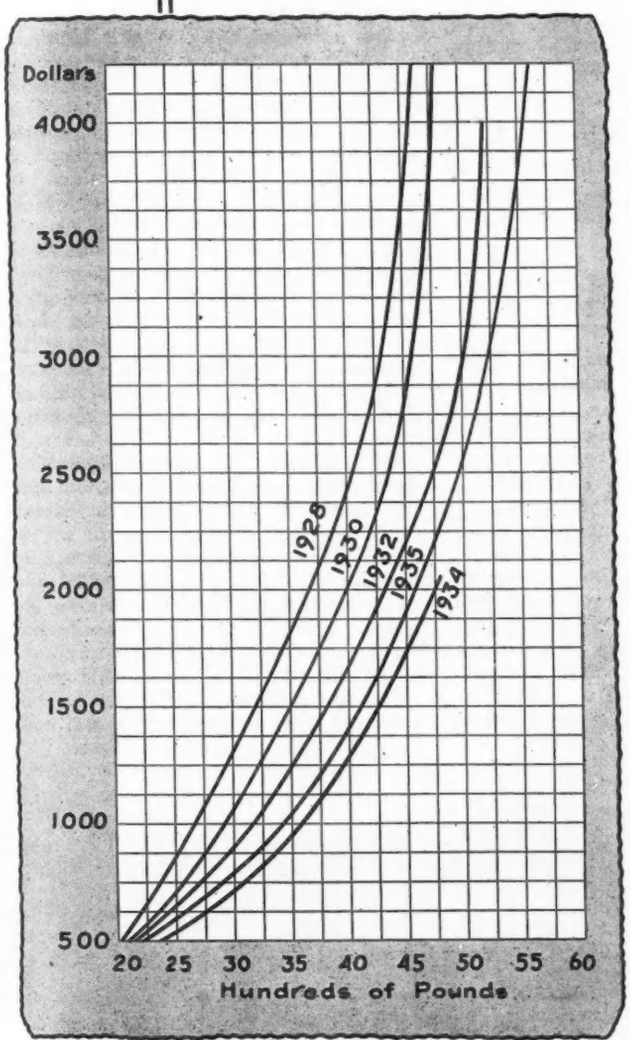
ACCORDING to Dr.-Ing. K. Schlaefke (*Mitteilungen aus den Forschungsanstalten* for February, 1935), the simple types of governor used for truck engines of the spark-ignition type (usually steel-ball governors) are not satisfactory for automotive Diesel engines. In the M. A. N. six-cylinder commercial-vehicle engine, three cylinders are cut out when idling, with the results that the minimum fuel charge which has to be delivered by the injection pump is nearly doubled and that the three inoperative cylinders can be used as vacuum pumps to operate the brakes. In the design of the dual governor for this engine the following principles were adhered to: The centrifugal forces on the governor weights and the forces of the governor springs are directly balanced against each other, which is the only way to keep down friction in the governor to a minimum. For the same reason the weights are supported on axes through their centers of gravity. Finally, an equalizing link is provided which prevents any inequality in the pressures on corresponding springs.

Publications Received

Thirty Years of Educational Pioneering—The Philosophy of the Cooperative System and its Practical Test, by Herman Schneider. Published by the University of Cincinnati, Cincinnati, Ohio.

Photoelastic Properties of Soft Vulcanized Rubber, by Wilfred E. Thibodeau and Archibald T. McPherson. Research Paper RP751 of the National Bureau of Standards. Obtainable from the Superintendent of Documents, Washington, D. C. (5 cents.)

1935 Cars Cost Slightly More per Pound



ABOUT a year ago we made a survey of the weights and list prices of American passenger cars covering the years 1928, 1930, 1932 and 1934. It was shown at the time that during the period covered by the survey, cars generally had grown in size and that for the same amount of money a good deal more car weight was being offered in 1934 that six years previously; in fact, the price/weight ratio had declined continuously during that period.

Official price and weight figures for 1935 are now available, which make possible a comparison with the same figures for 1934. As might have been expected, prices have risen somewhat, though the increases have been moderate. Thus passenger car prices on a weight basis reached bottom in 1934, two years after production and sales were at their lowest point.

In compiling the accompanying table, the method of procedure was the same as that followed last year; that is, first the weights and prices of all cars within weight range of 200 lb. were averaged and the equivalent price of a car whose weight is the nearest round figure in hundreds of pounds was then determined. The results for 1934 and 1935 are as follows:

Weight	1934	1935	Increase in Per Cent
2700 lb.	$615	$644	4.6
2900 lb.	800	813	1.6
3100 lb.	715	763	6.7
3300 lb.	847	931	9.9
3500 lb.	952	977	2.6
3700 lb.	1,062	1,205	13.4
3900 lb.	1,160	1,352	16.5
4400 lb.	1,810	....	...
4800 lb.	2,052	2,246	9.5
5600 lb.	....	4,668	...

The average of the price increases for the various classes is 8.1 per cent.

Walker Improves His Parking Mechanism

BROOKS WALKER of Piedmont, Cal., who has been working on parking mechanisms for passenger cars for quite a few years, has recently developed some new designs applicable to cars with streamlined bodies. One of the new models involves a simplified drive to the spare wheel, which latter is placed directly back of the rear axle and ahead of the baggage compartment. In the case of worm or hypoid final drive the drive to the spare wheel is taken from an extension of the worm or pinion shaft. The baggage space is increased by carrying the fuel within the fender contour. Another design allows the tire to be carried at any desired angle at the rear of the body and lifts the car with the wheel perpendicular to the road. The tire cover is built into the baggage compartment door.

This mechanism, known as the Walker Parccar, can be built into cars in the process of manufacture only and cannot be applied to cars already in use. The rear part of the car is raised on the spare wheel and power is applied to the latter to swing the rear end around, by means of a control lever on the instrument board.

NEW DEVELOPMENTS

Automotive Parts, Accessories and Production Tools

Loney Door Handle and Concealed Hinge

Two new products of interest to automobile body builders have just been announced by the Harley C. Loney Company, Detroit, namely, a new type door handle and a concealed hinge. The door handle does not project beyond the door itself and the door panel is recessed enough to permit of inserting the hand behind the handle. To open the door, the handle is merely pulled outward.

Among the advantages claimed for this door handle is that it cannot cause injury to a person walking against a moving car from the side, and that it foils bandits, as no one can cling to the running board when the car door is locked from the inside. It is also impossible for thieves to break into the car by using a wrench or pipe on the handle.

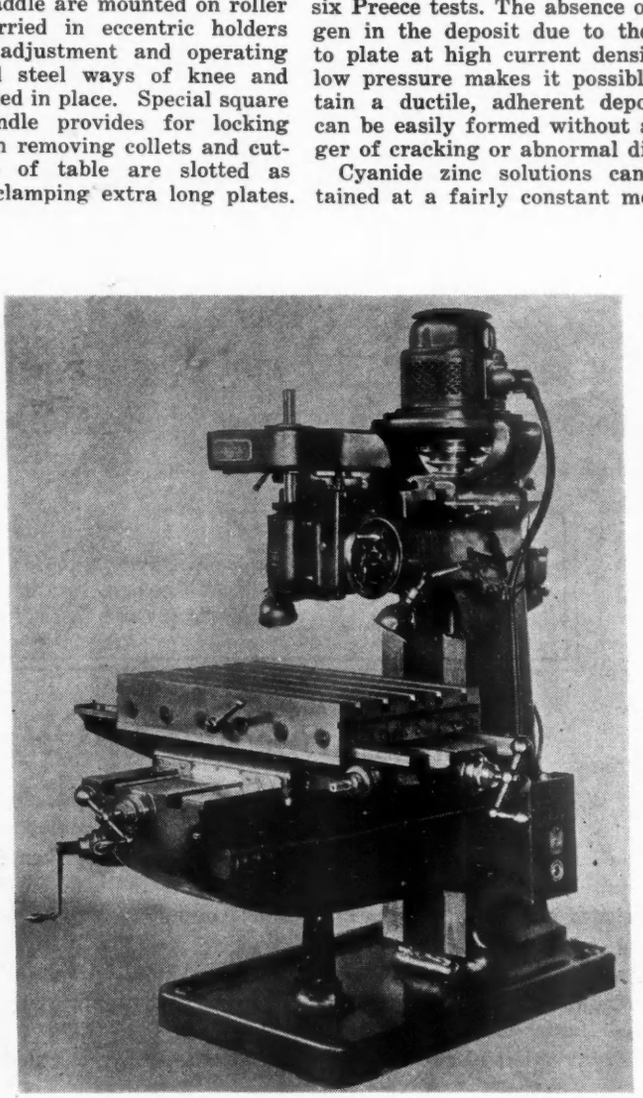
The new door handle is said to be simple in design and no more expensive than the conventional type. It helps to smooth the outside of the car, and the handles cannot be seen from the front or rear.

The car illustrated herewith is equipped with the Loney door handles and concealed hinges. The outside lock shown just above the door handle is a separate unit. The door is locked from the outside by merely pushing the finger against the center unit of the lock itself.

The Loney concealed door hinges are said to have been developed to a point where they are applicable to all makes of cars, and their cost is claimed to be no greater than that of the conventional type. They too add to the appearance of the car.

Vertical Milling and Die Sinking Machine

A vertical milling and die sinking machine, Model 3VS, designed especially for rubber mold and metal pattern work, has been placed on the market by the Reed-Prentice Corp., Worcester, Mass. It is equipped for hand longitudinal and cross feeds. Table and saddle are mounted on roller bearings carried in eccentric holders for proper adjustment and operating on hardened steel ways of knee and saddle doweled in place. Special square nut on spindle provides for locking spindle when removing collets and cutters. Ends of table are slotted as shown for clamping extra long plates. Longitudinal and cross-feed screws are provided with adjustable nuts.



Push button control with a magnetic switch and plugging relay provide for a quick stop of the spindle as on the standard 3V machine. The machine is provided with 10 spindle speeds, from 400 to 2600 r.p.m., when using a 1200 r.p.m. motor.

Zam Anodes

The Hanson-Van Winkle-Munning Co., Matawan, N. J., announces the development of a new anode, ZAM (zinc, aluminum, mercury). This anode is not attacked by either acid or cyanide solutions until the current is applied. This makes it possible to have an anode free from sludge, and which, therefore, can be completely used in a zinc solution. Practically no increase of voltage will be required at any time, either at the start of or during the plating, whether the run is short or very long. This permits setting the rheostat at a required point with complete assurance that the desired amount of zinc will be deposited in the given time.

It is claimed, that with ZAM anodes, a deposit can be obtained, without any extra precautions, that will withstand six Preece tests. The absence of hydrogen in the deposit due to the ability to plate at high current densities and low pressure makes it possible to obtain a ductile, adherent deposit that can be easily formed without any danger of cracking or abnormal distortion.

Cyanide zinc solutions can be obtained at a fairly constant metal con-

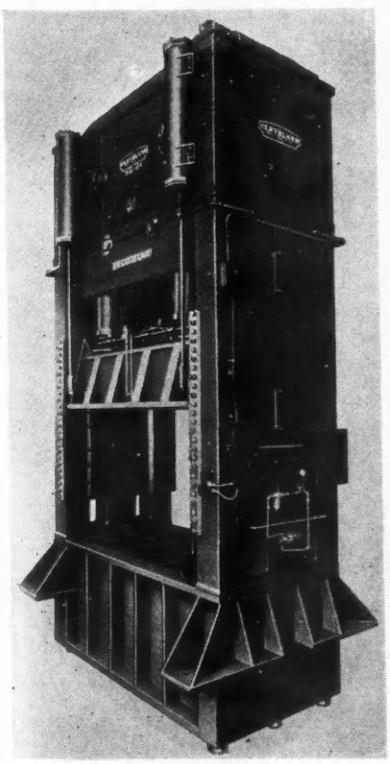
tent by the anodes. This is made possible by the use of steel containers and ball anodes.

ZAM anodes can be used in cadmium solutions and will convert such solution into zinc solutions without trouble.

Welded Plate Construction in New Power Press

The use of welded steel plate construction in the building of power presses by The Cleveland Punch & Shear Works Company, Cleveland, Ohio, is illustrated by this large press which is used for forming body panels. It weighs approximately 225,000 lb., is 30 ft. high and has a capacity of 500-tons pressure at the beginning of the draw.

The bed measures 80 in. x 124 in. with openings in bed 60 in. and 118 in. The ram is 80 in. x 116 in., stroke 24 in., adjustment 32 in., and the maximum die height is 56 in. The press is of the 4-point suspension type, which prevents tilting of the slide, an especially desirable feature where there is an uneven pressure on the dies. The slide is provided with four massive adjusting screws of the barrel type which are connected by an interlocking gear system whereby their functioning is coordinated. This power-adjusting mechanism is controlled and operated by one of the three push-button controls and is designed to prevent the operation of the press at the wrong time. Adjustment cannot be made while the locking motor is set nor can the press be operated until the locking motor is set. The other two push-button controls are used for operating the press and for adjusting the ram.



The press has a speed of eight strokes per minute and is provided with a 30-hp. high-torque motor. Multiple V belts are employed to drive the flywheel which is equipped with a multiple disk air clutch and brake. In operation, the drive pinion engages with the two intermediate gears, which in turn operate the four main shafts and the important feature of this design is that it constitutes a balanced drive to all four points of the slide.

Technical Facts About Motor Oils

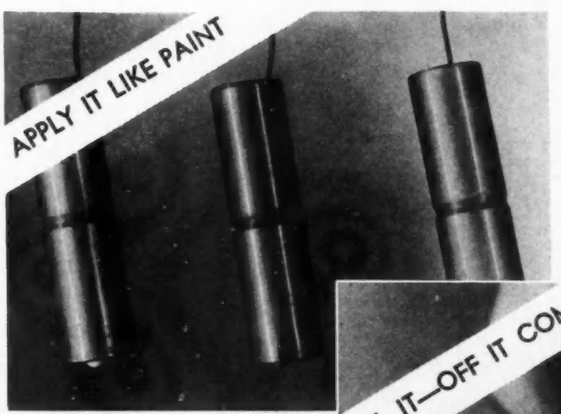
Technical Facts About Motor Oils, by E. W. Hutton and T. F. Harms of the Lubricants and Special Products Department of the Union Oil Company of California. Published by the Union Oil Company of California, Los Angeles.

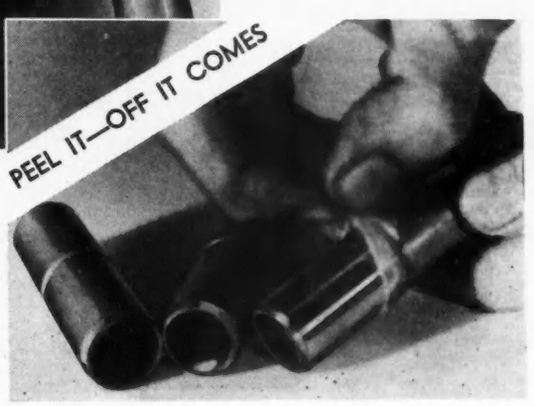
THIS booklet was prepared in connection with the introduction of a new brand of motor oil, Triton, by the company publishing it. In addition to describing this product, the book deals briefly and clearly with the various tests made on oils and their significance. The various apparatus used in making oil tests are illustrated by clear, large-scale drawings, and a number of graphs and conversion charts are included in the text.

Announcing

KELSANITE *A Revolutionary Protective and Masking Coat . . Resilient, Chemical Proof, Waterproof, Airtight.*

FOR PROTECTION: Kelsanite 1094 ends three of your most serious wastes: abrasion, rust, and chemical attack in process, in transit, and in storage. Kelsanite is a new non-inflammable liquid applied by brush, spray, or dipping. Turns into a protective coat of *resilient, live rubber* in a few minutes. Possesses high adhesive qualities. Peels off quickly and easily, removing with it all dirt, and leaving surface clean and dry.





PROTECTS

Bodies	Windshield	Wrist Pins
Fenders	Frames	All Plated
Panels	Lamps	Trim
Bumpers	Springs	Parts

—or any engine or body part subject to damage by exposure or handling. Speeds production. Saves money in all plating operations.

FOR MASKING: Kelsanite 1076, a new masking process for enameling and lacquering departments. Saves 25c to $2.00 or more a car over conventional methods. Less labor; less material. Quicker to apply and remove. Permits striping without special guns.

Kelsanite can effect important savings in your plant. Information on tests by leading motor companies on request. Write for free samples and complete information.

KELSAN PRODUCTS—ST. CLAIR, MICH.

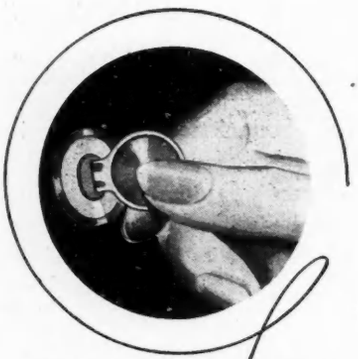
Only STARTIX provides completely *Automatic Starting*

Automatic Starting is triple action — Just a turn of the switch key and Startix

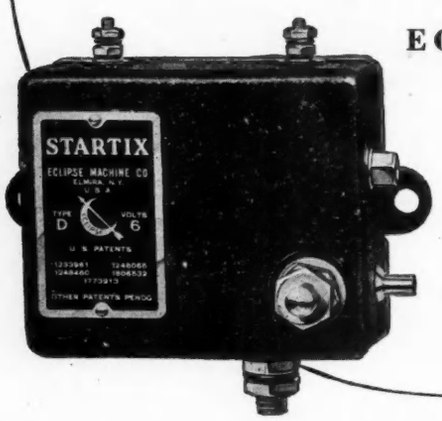
1. **Automatically *starts* the engine**
2. **Automatically *repeats* if necessary**
3. **Automatically *restarts* it if the engine stalls**

No attention on the driver's part *at any time* is necessary because Startix *automatically* does *all three* things just as long as the switch key is turned *on*. The manipulation of button or pedal controls to start or restart the engine is entirely eliminated.

Startix is adaptable to any car, new or old, equipped with the Bendix Drive—the famous "Mechanical Hand That Cranks Your Car"—which is an integral part of complete automatic starting and restarting. Many popular cars have Startix as standard equipment.



Turn the switch



...Startix takes charge

ECLIPSE MACHINE COMPANY
ELMIRA, NEW YORK
(Subsidiary of Bendix Aviation Corporation)

...Bendix Drive cranks your engine

STARTIX

plus Bendix Drive *equals*
Automatic Starting